# TATSUNO-BENČ EUROPE A.S.



# Combined dispensers Liquid Fuel & LPG series SHARK BMP2000.S

## Installation and User Manual

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INSTALLATION AND USER MANUAL

# Combined dispensers Liquid Fuel & LPG series SHARK BMP2000.S

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TATSUNO Benč

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# 0. Introductions

## 0.1. Graphical Symbols and Terms Used in the Manual

Symbols used in this Manual:

Caution

Explosion hazard

Caution – Electric equipment

No smoking

No open fire

No mobile phones

The terms used in this Manual requiring special attention:

1) **CAUTION**

It is absolutely necessary to observe requirements mentioned under this heading. Breach of these requirements can cause heavy injury or death of person or property damages.

2) **WARNING**

Breach of requirements mentioned under this heading can cause heavy injury of person and/or fuel dispenser damage.

3) **ATTENTION**

The text mentioned under this heading refers to the legal and/or statutory requirements, controlling assembly and use of the fuel dispenser. Breach of these requirements can cause dangerous situation and/or fuel dispenser damage.

4) **NOTE**

The text mentioned under this heading refers to the assembly procedures, techniques and operating methods, etc., which are important for correct assembly and correct operation of the fuel dispenser and their breach can result in damage, failure or bad fuel dispenser performance.

## 0.2. Read Up the Manual First

Read the relevant parts of the Manual before installation or operation of the fuel dispenser. Consider all hazards, attentions and notes mentioned in the Manual.

The manufacturer has compiled this Installation and User Manual in order to provide all necessary information and instructions for full and effective installation, operation and maintenance of your fuel dispensers of the BMP2000.S type series.

The Manual was produced by the manufacturer and is the integral part of the fuel dispenser accessories.

The user is fully responsible for use of the Manual; all operations not described in this Manual are forbidden. The service operator carrying out such operations will be responsible for consequences of his acts.

The Manual is arranged organised in particular sections divided in subsections. Each subject may be independent and may correspond to the operation logic (learn – prepare – use – maintain).

The Manual exactly represents the technical conditions at the moment of fuel dispenser sale and there is no possibility to consider it for nonconforming due to follow-up alterations and upgrades performed on the basis of the latest actualities.

**ATTENTION**

**KEEP THIS MANUAL AND ATTACHED DOCUMENTS FOR FURTHER USE ALL THE TIME PERIOD OF FUEL DISPENSER SERVICE!**

## 0.3. Permissible Use

The combined fuel dispensers of BMP2000.S type series are intended for stationary installation to pumping of petrol, kerosene, diesel fuel and liquefied propane-butane gas (hereinafter LPG) from the tank to vehicles in the preset volume.

**CAUTION**

The fuel dispenser is very difficult equipment providing a number of exacting functions. **Before putting into operation the tanks and pipelines have to be cleaned and fuel purity check have to be performed (filter pollution in the dispenser is not reason for guarantee repair!). Before starting up of operation, the wiring inspection and correct wiring check have to be performed to prevent electrical injury and to ensure explosion safety (fuels are first-class combustible).**

Each fuel dispenser has been tested from the points of its function, safety and metrology by the manufacturing plant. The certification documents, which shall be submitted to the competent authorities by the user if required, are the integral part of the delivery.

# 1. Fuel Dispensers TATSUNO-BENČ

## 1.1. Basic Technical Data

**LIQUID FUEL hydraulic system of dispenser**

| | | |
|---|---|---|
| Delivered flow rate : | - standard | 30 ÷50 $dm^3$/min |
| | - high/H | 70 ÷ 90 $dm^3$/min |
| | - ultra-high/UH | 120 ÷ 150 $dm^3$/min |
| Dispensing accuracy : | | ± 0.5 % at the minimum delivery of 2 $dm^3$ (2 litres) |
| Maximum operating pressure : | | 0.18 MPa (1.8bar); 0.25 MPa (2.5bar) for /H and /UH |
| Electric motor : | | three-phase, 3x400V; 0,75 kW; 1395 rpm |
| Electromagnetic valves : | | 230V AC; 50 Hz; 5W as standard |
| | | 24V AC; 50 Hz; 5W for Puma HT-TE and Puma MPD |
| | | +24V DC; max.0.500A for proportional valves |

**LPG hydraulic system of dispenser**

| | | |
|---|---|---|
| Dispensed medium | | liquefied propane-butane |
| Maximum flow rate | Q max | 50 $dm^3$. min-1 |
| Minimum flow rate | Q min | 5 $dm^3$. min-1 |
| Min. volume of refuelling | V min | 5 $dm^3$ |
| Cyclic volume | Vc | 0,5 $dm^3$ |
| Operating pressure | p | 1,6 MPa |
| Max. operating pressure | $p_{max}$ | 1,8 MPa |
| Nominal pressure | $p_N$ | 2,5 MPa |
| Test pressure | $p_z$ | 4,0 MPa |
| Accuracy of dispensing | | ± 1% |
| Nominal inside diameter of piping-supply piping | | DN 19 |
| | return piping | DN 16 |

**Electronic counter:**

| | |
|---|---|
| Power supply : | ~230 V; +10% -15%; 50 Hz ± 5 Hz |
| Power input : | max. 200 VA |
| Operating temperature : | -25°C to +55 °C |
| | (with heater -45°C to +55 °C) |
| Relative humidity : | max. 93 % at 55 °C |

**Displaying units:**

a) 7-segment LCD display with LED backlighting (type PDEDIL)

| | | |
|---|---|---|
| volume | | 0.01 to 9999.99 $dm^3$ |
| cash amount | | 0.1 to 99999.9 CZK |
| unit price | | 0.01 to 99.99 CZK/$dm^3$ |
| digit height | cash amount : | 2,54 mm (1“) |
| | volume : | 2,54 mm (1“) |
| | unit price: | 2,54 mm (1“) |

b) Proportional LCD display with LED back-lighting (type PDEDCU)

| | | |
|---|---|---|
| volume | | 0.01 to 9999.99 $dm^3$ |
| cash amount | | 0.1 to 99999.9 CZK |
| unit price | | 0.01 to 99.99 CZK/$dm^3$ |
| digit height | cash amount : | 30 mm |
| | volume : | 30 mm |
| | unit price : | 30 mm |

## 1.2. Fuel Dispenser Description

The combined fuel dispenser TATSUNO BENČ of series SHARK BMP 2000.S consists of two hydraulically independent units – standard dispenser for liquid fuels of series SHARK BMP2000.SM (MEDIUM) or SHARK BMP2000.ST (TALL) and module for liquefied propane-butane (LPG) dispensing SHARK MOD2000.SM/LPG (MEDIUM) or SHARK MOD2000.ST/LPG (TALL). Both hydraulic units LIQUID FUEL and LPG are mechanically separated and they have only common control – electronic counter, which is placed together with displaying units in the head of the combined dispenser.

The combined dispensers have the body parts (covers, doors, cover plates...) made of fireproof laminate approved for this use by the State Testing Laboratory (Certificate FTZÚ 04ST 0083). Supporting parts of the dispenser skeletons are made of steel lacquered sheet 0.8-1mm thick, eventually of stainless sheet. Standard colour design of the TATSUNO BENČ dispensers is in combination of white and grey colours. Each fuel dispenser is equipped with the **LIQUID FUEL hydraulic system** and **LPG hydraulic system** of the Japanese company **TATSUNO**. This is well-established worldwide-accepted hydraulic type with high reliability and long-term service life.

The LIQUID FUEL hydraulic system consist of the pumping monoblock, which is equipped with the inlet and outlet filter, gas and vapour separator, check valve and rotary pump with operating pressure control. The rotary four-piston **LIQUID FUEL flow meter** is possible to control through the only one piston. The high reliable two-channel **internal pulse generator** (explosion-proof design) is connected to the main shaft of each flow meter. The **LIQUID FUEL dispensing hoses** are made of high-quality petrol-resistant rubber of antistatic design and they can be connected to the self-winding system (see models of series BMP2000.SM). The fuel dispensers are delivered with automatic stop-nozzle of the **ZVA** company (Elaflex) as standard.

The LPG hydraulic system consists of the two-channel **external pulse generator** TATSUNO, which is installed on the piston meter. The **measuring unit** consisting of the built-in flow meter, filter, separator, check-valve for the liquid phase and safety valve for the gaseous phase is placed on the meter support in the low part of the hydraulic system module. The **safety valve** is set to pressure of 1,8 MPa and prevents to exceeding of max. operating pressure by re-fuelling of the liquid phase back into the storage tank. The **differential valve** TATSUNO, which keeps the medium in the liquid state in the flow meter, is installed on the flow meter output. This is reached by stepwise pressure regulation at the beginning of pumping. The measuring unit is on the inlet completed with closing **spherical valve G ¾"**. The medium dispensed after passing through the flow meter and differential valve goes through the sight glass, **safety breakaway coupling** into the **LPG dispensing hose** and through the **LPG nozzle** (OPW - Brevetti Nettuno) is transported into the vehicle storage tank. Possible gaseous components are separated in the separator and they go back through the safety valve into the return piping (DN 16), which is connected to the storage tank. The spherical valve G ½" is integral part of the return piping. Charging pressure is possible to watch on the **manometer** installed below the nozzle hanger.

Each dispenser is equipped with the **electronic counter** with self-diagnostics and **displays** displaying dispensed amount in CZK, fuel volume in litres and fuel unit price in CZK/L. By the dispensers for non-public sale the display is displaying only dispensed amount of fuel in litres.

The electronic **counter PDE/PDEX**, manufactured by the TATSUNO-BENČ EUROPE a.s. company and installed in the counter module, is used as standard at the fuel dispensers. The electronic counter processes pulses from the generator and transmits them on the displays, where the delivery amount, sum and price per volume unit are displayed. The fuel dispensers can be possible operated in the **manual mode** without the control system, or in the **automatic mode** connected via data communication line to the point of sale of the filling station.

**Data Communication**
The fuel dispenser communicates as standard with the point of sale via the data line with the PDE communication protocol. The dispenser can be equipped with the data converter, which enables communication after other protocol type, if required.

**Pre-selection**
The special electromagnetic slowing-down valve ensuring the accurate price pre-selection and dispensed fuel

volume and well-arranged four-button keyboard, enabling pre-selection control of amount and volume of dispensed fuel by the customer direct from the dispenser, can be installed in the all fuel dispensers types.

**Temperature correction system**

The fuel dispensers can be equipped with the facility for the temperature correction of dispensed volume. The well with the temperature sensor Pt100, which monitors medium temperature for every second, is installed before the flow meter (in piping or separator). This information is transmitted to the electronic counter, where the check calculation of the dispensed volume according to the volume/temperature dependence and required specific gravity at reference temperature ($15^0$C) is performed.

**Special colour design**

The dispenser can be delivered also in any colour design, if required (colour according to the scale RAL, ČSN, Colorlak or special). For the special colour design the extra is charged. Its amount is dependent on the type and tint of the required colour.

## 1.3. Brief Characteristics of LPG Medium

LPG is the trade name for liquefied mix of light hydrocarbons mainly with three to four carbon atoms in the molecule. LPG is obtained by synthetic petrol production and recently also by natural gas processing. The liquefied LPG is a clear easily evasive liquid of specific odour.

By releasing overpressure the liquefied LPG is evaporated quickly and flammable gas, roughly twice as heavy as air, is generated. By evaporation of 1 $m^3$ of liquefied LPG (ca 550 kg) into air, ca 12.400 ÷ 83.330 $m^3$ of explosive mix, which is heavier than air and it is accumulated close to the earth, is generated by gas dilution to the lower explosion limit.

| **Physical properties of liquid state** | **propane** | **butane** |
|---|---|---|
| formula | $C_3H_8$ | $C_4H_{10}$ |
| molecular weight | 44,09 | 58,12 |
| boiling temperature (°C) | -42,6 | -0,6 |
| density (kg/$m^3$ at 20°C) | 502 | 579 |
| **Physical properties of gaseous state** | **propane** | **butane** |
| density (kg/$m^3$ at atmospheric pressure) | 1,865 | 2,76 |
| consistency (air = 1) | 1,562 | 2,091 |
| efficiency (MJ/$m^3$ at 0°C and atmospheric pressure) | 93,57 | 123,76 |
| **Explosion limit in mixture with air in % volume** | **propane** | **butane** |
| bottom | 1,7 | 1,3 |
| upper | 10,9 | 9,3 |
| ignition temperature in °C | 465 | 365 |

*Table 1 – Physical properties of main LPG mix components*

Physical properties of LPG mixture are in the range of individual component properties. The liquefied LPG has similar properties as petrol, i.e. it dissolves and dries rubber latex sealing, organic lubricant, lacquer and other related materials. On the other hand, synthetic rubber, graphite packing, Teflon material, etc. are resistant to LPG attacks. Teflon bands or LOCTITE preparation are used for sealing of the screw connections for liquefied or gaseous LPG. Using of spirit jointing compounds or binding materials of lamp black (HERMETIC, HERMOSAL) results to difficult demountability of these connections. Teflon lutes or lutes of klingerit suitable for LPG are determined for flanged connections.

The gaseous LPG has lightly narcotic effect on the human organism. Breathing of gaseous LPG causes, after some time, headache, nausea, weariness, dissipated attention, sleepiness. If there is no ignition and scorch of the operator, the gaseous LPG may cause suffocation of the operators, though it is not poisonous directly like e.g. the city gas. As it is heavier than air, it is accumulated close to the earth and in the caverns; the lying person (unconscious) may be in the unbreathable atmosphere. The gaseous LPG also causes skin degreasing.

The liquefied LPG is evaporated by boiling under the temperature of -42°C at the steep drop of overpressure to the atmospheric pressure (e.g. leak of the liquefied LPG out of the device), and therefore contact of the skin with the liquefied LPG results in frostbites.

## 1.4. Survey of Type Models

The combined fuel dispensers TATSUNO BENČ, design SHARK, are manufactured in two type series:

- **series TALL** - variant of the standard LIQUID FUEL dispenser SHARK BMP2000.ST with free hanging dispensing hoses and the dispenser height of 2300mm with LPG module MOD2000.ST/LPG. There are two variants of the LPG module for the dispenser:
  - LPG module height of 2300, with two independent inputs for liquid phase - MOD2022.ST/LPG
  - LPG module height of 2300, with one common input for liquid phase - MOD2012.ST/LPG
  - LPG module height of 1900, with one common input for liquid phase - MOD2012.SM/LPG

- **series MEDIUM** - variant SHARK of the standard LIQUID FUEL dispenser SHARK BMP2000.SM with hose reels and the dispenser height of 1900mm. There is only one variant:
  - LPG module height of 1900, with one common input for liquid phase - MOD2012.SM/LPG

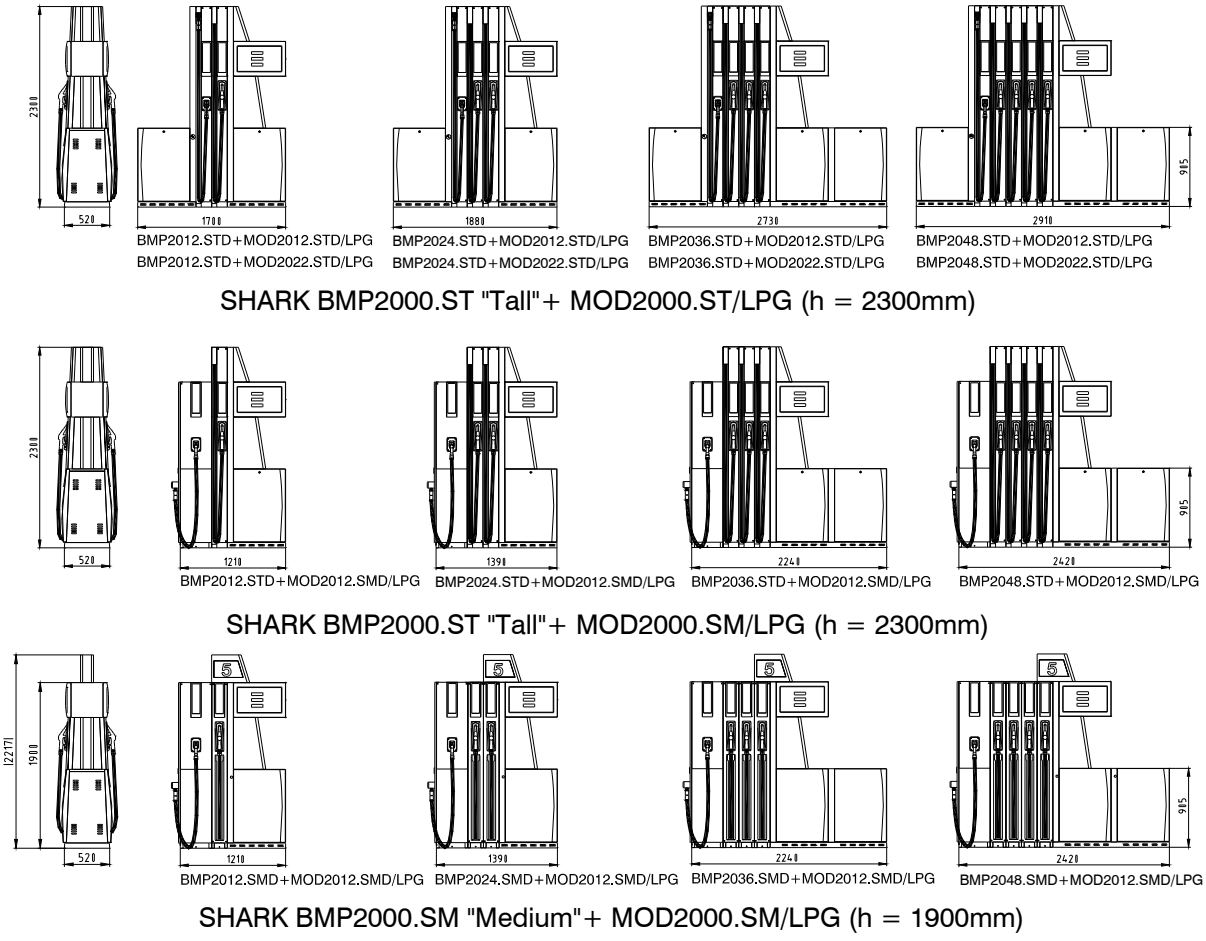



*Figure 1 – Survey of all types of the combined dispensers TATSUNO-BENČ design SHARK BMP2000.S*

Tables of all variants of the fuel dispenser type series are mentioned in the Appendix B, figures of the fuel dispensers can be found in the Appendix E.

All type series of the combined fuel dispensers differ by the following characteristics:

- **LPG module type.** There are 5 types of LPG modules, which differ by their height and design (model TALL 2300 mm, model MEDIUM 1900mm), by number of inputs for liquid phase and number of the dispensing hoses.

| LPG module type | Design | Height | Number of LPG inputs | Number of dispensing hoses |
|---|---|---|---|---|
| MOD2011.SML(R)/LPG | MEDIUM | 1900 | 1 | 1 |
| MOD2012.SMD/LPG | MEDIUM | 1900 | 1 | 2 |
| MOD2011.STL(R)/LPG | TALL | 2300 | 1 | 1 |
| MOD2012.STL(R)/LPG | TALL | 2300 | 1 | 2 |
| MOD2012.STD/LPG | TALL | 2300 | 2 | 2 |

*Table 2 - LPG module types*

  LPG module with one input includes only one common separator, where the liquid phase is divided in the two LPG flow meters. LPG module with two inputs includes two absolutely independent LPG hydraulic systems with two separators, two LPG flow meters and two outputs for gaseous phase.

- **Number of dispensing points.** The dispensing point is that part of the dispenser, where the customer can refuel himself independently. Each dispensing point can be equipped according to its series with one to four dispensing hoses, where the customer can select the fuel product type for dispensing and minimally with one display. Only one fuel type can be dispensed on one dispensing point at the same time. TATSUNO BENČ dispensers are equipped with one or two dispensing points.
- **Fuel dispenser orientation.** All dispensers can be divided to *one-sided or double-sided* according to their orientation. The double-sided dispensers enable car arrival and dispensing from both dispenser sides. The one-sided dispensers enable car arrival and dispensing from one dispenser side only. From the point of the car arrival the one-sided dispensers can be divided to *left-hand* (hoses are on the left side) and *right hand*.
- **Number of fuel products.** The dispenser can pump *one to four different fuel products* according to its type.
- **Number of dispensing hoses (nozzles).** Each dispensing point of the dispenser is equipped with one to four LIQUID FUEL dispensing hoses and one to two LPG hoses ended by nozzles. The dispenser can include 1 to 8 LIQUID FUEL dispensing hoses and 1 to 2 LPG dispensing hoses.
- **Delivered flow rate.** The delivered flow rate is max. available fuel flow through the nozzle. It is shown in $dm^3$ (litres) per minute. The TATSUNO BENČ dispensers provide three available speeds for LIQUID FUEL: standard speed 35 to 50 l/min., high speed 70 to 90 l/min. and ultra-high speed 120 to 150 l/min. For the LPG dispensers provide only one speed 50 l/min – this speed is dependent on the pump placed in the kiosk of the filling station.
- **Type of displaying units.** All displays can be divided by their type into *litre displays* and *displays for public dispensing*. The litre displays contain only the information about the disposed fuel amount in centilitres and are used on the dispensers specified for non-public dispensing (i.e. for internal company filling stations). The displays specified for public dispensing comprise also the cash amount in currency unit and the information about unit fuel product price.

# 1.5 . Nomenclature of Dispenser Basic Parts

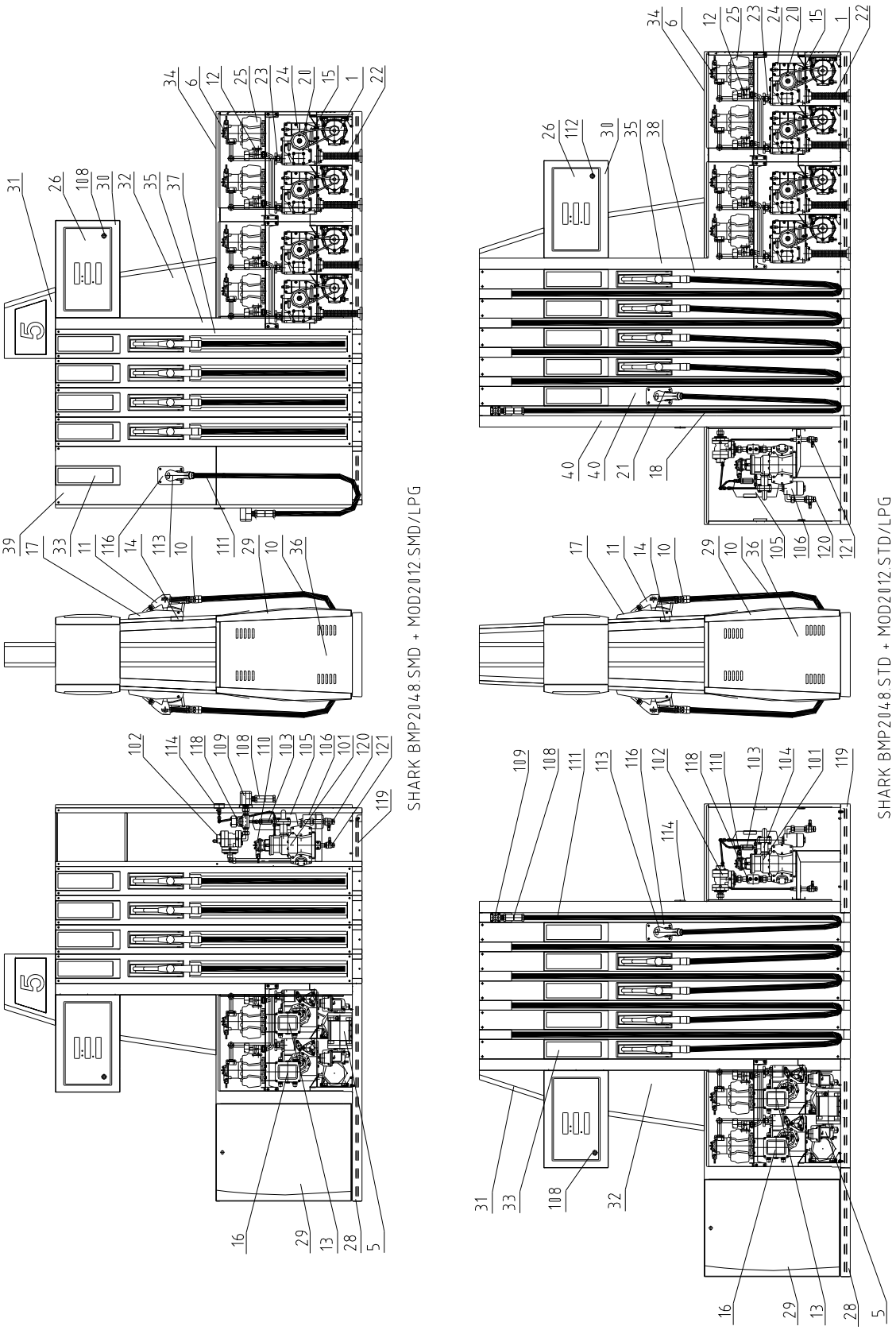



*Figure 2 –Basic parts of the combined dispenser TATSUNO-BENČ design SHARK BMP2000.S*

| Part of liquid fuel dispensing | | | |
|---|---|---|---|
| **Pos.** | **Description** | **Pos.** | **Description** |
| 22 | Connection suction piece – flexible type | 11 | LIQUID FUEL nozzle |
| 24 | Pumping monoblock TATSUNO | 17 | LIQUID FUEL nozzle cover (boot) |
| 25 | Piston meter TATSUNO | 18 | Nozzle adapter with sight glass |
| 1 | Electric motor of fuel pump | 14 | Magnetic switch of the LIQUID FUEL nozzle |
| 6 | Pulse generator TATSUNO - internal | 28 | LIQUID FUEL hydraulic system foundation |
| 12 | Solenoid valve | 34 | LIQUID FUEL hydraulic system cover |
| 5 | Suction pumps with electric motor and vapour flow sensors | 35 | Pillar internal |
| 20 | Monoblock pulley | 36 | Pillar frontal |
| 15 | Antistatic V-belt | 37 | Pillar of reel - 1900 |
| 10 | LIQUID FUEL dispensing hose | 38 | Pillar I - 2300 |

| Part of liquefied propane-butane dispensing (LPG) | | | |
|---|---|---|---|
| **Pos.** | **Description** | **Pos.** | **Description** |
| 120 | Inlet piping for LPG liquid phase with spherical valve | 109 | LPG sight glass |
| 121 | Outlet piping for LPG gaseous phase with spherical valve | 108 | LPG safety breakaway coupling |
| 106 | LPG filter | 111 | LPG dispensing hose |
| 105 | Separator of gaseous phase | 113 | LPG nozzle |
| 118 | LPG solenoid valve | 116 | LPG nozzle cover (LPG boot) |
| 101 | LPG meter TATSUNO | 108 | LPG dispensing switch |
| 110 | Pulse generator TATSUNO - external | 119 | LPG hydraulic system foundation |
| 102 | Differential valve TATSUNO | 39 | LPG pillar - 1900 |
| 103 | Safety valve TATSUNO | 40 | LPG pillar - 2300 |
| 104 | Check valve TATSUNO | 41 | Pillar internal LPG - 2300 |
| 114 | Manometer | | |

| Common part of the combined dispenser | | | |
|---|---|---|---|
| **Pos.** | **Description** | **Pos.** | **Description** |
| 13 | Electric distribution box - power (feeding) | 29 | Plastic doors right-hand and left-hand |
| 16 | Electric distribution box - data (communication) | 31 | Plastic paddle upper |
| 26 | Dispenser head with electronic counter | 32 | Plastic paddle bottom |
| 32 | Display plastic panel - configuration | 33 | Plastic cover of product |

## 1.6. Rating Plates

The combined fuel dispensers are equipped with three types of plates:

- rating plate - LIQUID FUEL part of the dispenser
- information plate - LIQUID FUEL part of the dispenser
- rating plate - LPG part of the dispenser

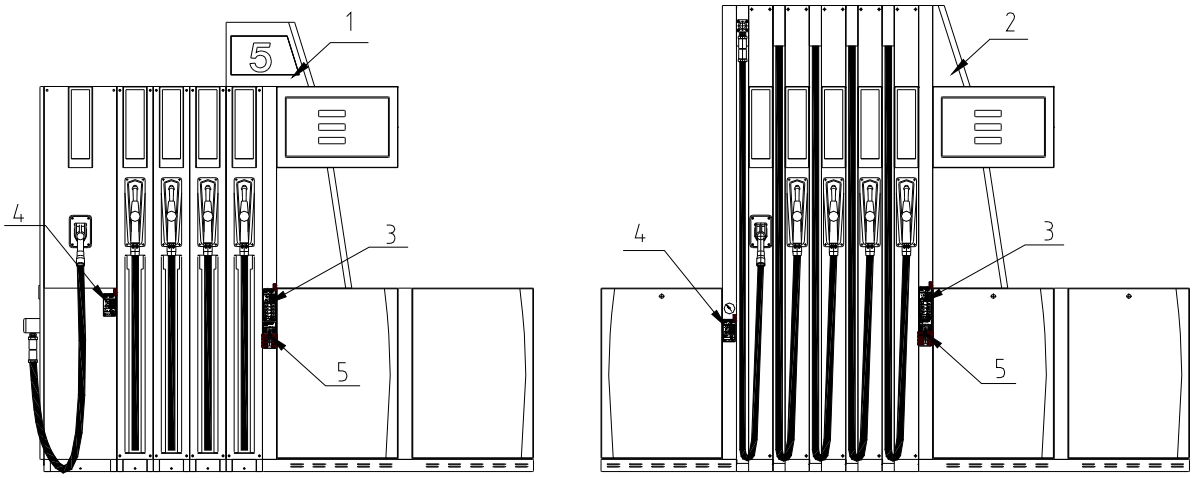



*Figure 3 – Placing of the rating plates on the combined dispenser SHARK BMP2000.S*
*(1-dispenser SHARK of series MEDIUM, 2-dispenser SHARK of series TALL, 3-plate for the LIQUID FUEL dispenser, 4-plate for the LPG module, 5-information plate)*

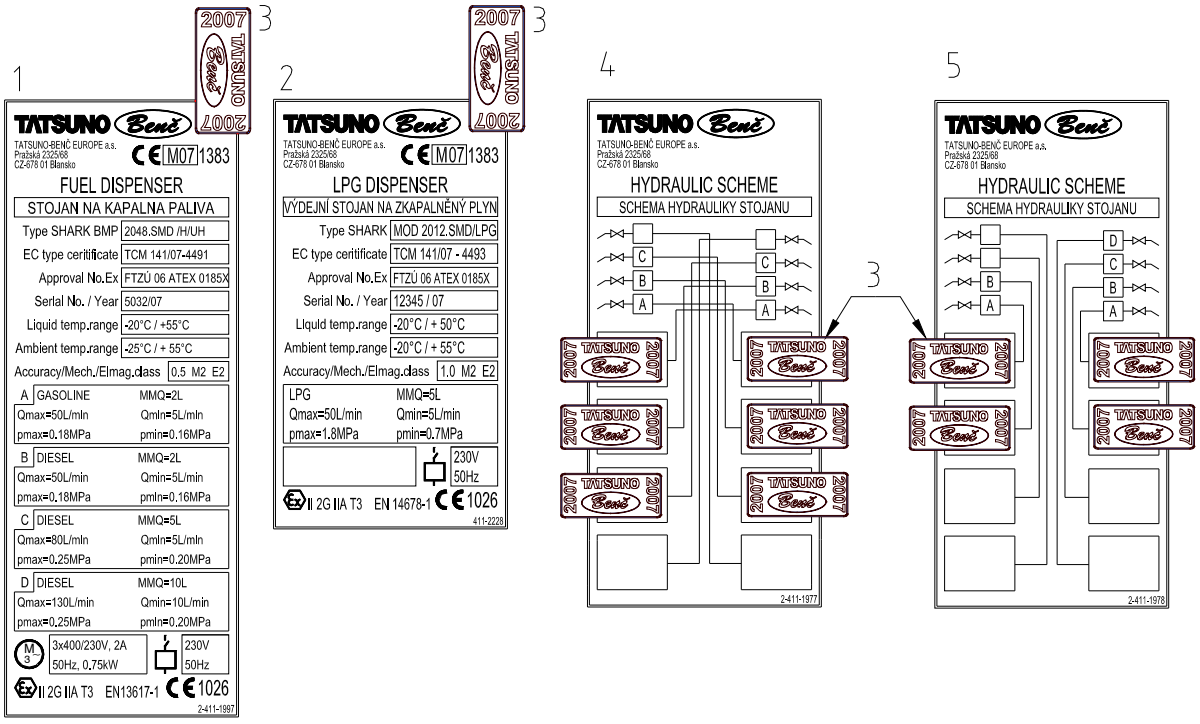



*Figure 4 – Possibilities of the European rating plates for the combined fuel dispensers*
*(1-plate for the LIQUID FUEL dispenser, 2- plate for the LPG module, 3- TBE testing label, 4-information plate for the LIQUID FUEL dispensers of series MEDIUM, 5-information plate for the LIQUID FUEL dispensers of series TALL)*

**Information of the rating plate for the LIQUID FUEL dispenser and LPG module**

| | |
|---|---|
| TATSUNO-BENČ EUROPE a.s. | Name and address of fuel dispenser manufacturer |
| CE M07 1383 | Marking of the dispenser means that it has been designed, manufactured and marked in conformity with European Commission Directives. The dispenser is subject to metrological certification of type examination in accordance with Directive of European Parliament and Council No. 2004/22/EC – MID, carried out by the Notified Body No. 1383 – ČMI Brno (see EC Certificate of Conformity - Appendix K) |
| LPG DISPENSER<br>LIQUID FUEL DISPENSING PUMP | Scope of use of the device |
| Type SHARK BMP | Marking of the fuel dispenser type, eventually LPG module (see Appendix B) |
| EC Type Certificate | No. of the metrological EC type certificate - ČMI Brno |
| Approval No. Ex | No. of the EC of the type ATEX certificate – FTZÚ Ostrava-Radvanice |
| Serial No / Year | Serial number of the fuel dispenser (serial number/fabrication year) |
| Liquid temper. range | Permitted temperature range for medium temperature |
| Ambient temper. range | Permitted temperature range for ambient surroundings |
| Accuracy /Mech./Elmag. class | Accuracy class of meter / Mechanical class / Electromagnetic class |
| A, B, C, D | Type of dispensed liquid and its metrological parameters:<br>MMQ – minimum dispensed quantity, Qmax – maximum flow rate, Qmin – minimum flow rate, pmax – maximum pressure, pmin – minimum pressure |
| motor power supply | 3x400/230V; 50Hz; P=0,75kW; I=2A |
| valve power supply | 230V; 50Hz or 24V; 50Hz or 24V DC |
| CE 1026 | Marking of the fuel dispenser means that it has been designed, manufactured and marked in conformity with European Commission Directives. The dispenser is subject to certification of type retesting in accordance with the Directive No. 94/9/EC – ATEX, carried out by the Notified Body No. 1026 – FTZÚ Ostrava Radvanice<br>(see EC Certificate of Conformity - Appendix K) |
| Ex II 2G IIA T3 | Marking of explosion protected electrical:<br>**II 2** – equipment for explosion hazard rooms other than the mines, probability of explosive atmosphere origin - zone 1<br>**G** – explosive atmosphere created by gases, vapours or mists<br>**IIA** – gas group – least dangerous<br>**T3** – maximum temperature of electric equipment which might cause ignition of the ambient atmosphere (200°C) |
| **EN 13617-1, EN 14678-1** | European standards for the LIQUID FUEL/LPG fuel dispensers – the dispenser has been designed, manufactured and approved by the Notified Body No. 1026 – FTZÚ Ostrava Radvanice in accordance with them. |

# 2. Installation

## 2.1. Instructions for Safe Operation

**CAUTION**

- **The equipment has to be installed by the staff qualified and authorised in accordance with relevant standards, regulations, local limitations, and according to this Manual.**
- **Smoking and open fire handling is prohibited in the immediate vicinity of the dispenser.**
- **Always observe the rules for LPG, petrol and diesel fuel handling.**
- **Monitor all leaks in the dispenser. In the case of fuel leakage power supply must be disconnected. Contact the service organisation.**
- **Electrical wiring must be carried out by the qualified staff.**
- **Make sure that the operable fire extinguisher is available.**
- **When handling the device, use suitable protective means.**

## 2.2. Receipt, Transport, Unpacking

The customer shall conclude the method of the dispenser delivery with the manufacturer. Should the company TATSUNO-BENČ EUROPE a.s. s.r.o. provide the transport, the product will be transported to the agreed place. The manufacturer has adequate knowledge of the method of handling and transport. Should the transport be provided by another method selected by the customer, the manufacturer shall provide professional loading, but he is not responsible for the method of transport. It is determined in general that the dispenser must be transported packed dully, always fixed on the frame. The dispenser must be fixed on the vehicle and protected from damage (covers, paints), displacement and overturning. Handling and transport must be done in vertical position only; the dispenser may not be put on the covers.

**WARNING**

**When handling the dispenser, only high-lift trucks may be used. TATSUNO-BENČ EUROPE a.s. is not responsible for possible damage, if other handling device is used!**

## 2.3. Fuel Dispenser Installation

### 2.3.1. Generally

The manufacturer recommends installing the liquid fuel dispensers TATSUNO BENČ on filling station islands so that the direction of car arrival to the dispenser is the same as the arrow symbol (see the Appendix E). Product numbering can also be found in the Appendices F and H.

### 2.3.2. One-sided Dispenser Orientation

One-sided dispensers are marked by block letters "L" and "R" ("L"-left-hand and "R"-right-hand) after designation of the dispenser type (e.g. BMP2044.SML+MOD2011.SML/LPG – left-hand, one-sided, four-product dispenser with LPG module, variant MEDIUM 1900mm). Dispenser orientation is determined by viewing of the dispenser from the direction of car arrival.

### 2.3.3. Distance of Fuel Dispenser from Tank

The manufacturer recommends the **50-meter** maximum distance of the dispensers from the fuel tanks and the suction lift up to **5.5 meters.** Under other conditions there can be worse suction ability of the dispenser, which results in reduced pump capacity (flow rate). All technological requirements for the filling station must be resolved by the professionally processed and approved design of the filling station consulted with the dispenser manufacturer.

The manufacturer recommends at least **1-meter** distance of the one-sided dispenser from the wall.

### 2.3.4. Fuel Tank Type

Dispenser(s) can be connected both to the underground tanks and to the aboveground tanks.

The steel base frame shall be levelled and seated into concrete on the shaft, which the suction piping of the reservoir (underground) tank leads from. The base frame is not part of the dispenser delivery. The dispenser is mounted on this frame. The following supply cables must be led into the shaft under the dispenser (in addition to the conductor for grounding connection:

- for three-phase electric motor feeding – the four-core cable **Y-JZ 4 x 1.5** or **CMSM 4B x 1.5**
- for switching of LPG pump installed in the kiosk - the four-core cable **Y-JZ 4 x 1.5** or **CMSM 4B x 1.5**
- for feeding of counter and switching circuits of the dispenser – the five-core cable **Y-JB 5 x 1.5** or **CMSM 5C x 1**
- communication line – shielded cable **CY-JZ 5 x 0.75** or **CMFM 4D x 1**

It is possible to mount the dispenser on the ECO leakage sump, replacing the base frame and preventing oil product leakage.

**ATTENTION**

**Supply lines to the fuel dispenser must be sealed perfectly to prevent penetration of flammable liquids or their vapours inside the dispenser. Only the cable terminals resistant to flammable liquids may be used in the shafts under the dispenser.** Cable entries may be used for one cable only, unless their design is specified for more cables.

**CAUTION**

If the fuel dispenser is connected to the **underground tank**, the **check valve** must be inserted in the suction piping; the check valve must reliably prevent break of the fuel column at dispenser rest and subsequent air suction after start of refuelling. **The separate check valve may not be installed, if the suction strainer is already equipped by the check valve (see Figure 5)**

**CAUTION**

If the fuel dispenser is connected to the aboveground tank, it is necessary to incorporate the **pressure relief (check) valve** into the suction piping (for safety purposes) which guarantees that the dispenser pump generates the negative pressure of ca -0,03 Mpa. It is recommended the valve type **V316.XX**. The valves are manufactured by the company ZPA Slavičín. The **stop and discharge valve** should be installed in the lowest pipe point. The valve should be closed by the filling station operator whenever the fuel dispenser is out of operation. In the case of non-existence of these valves any pipe system leakage may result in uncontrolled **fuel leakage (see Figure 6).**

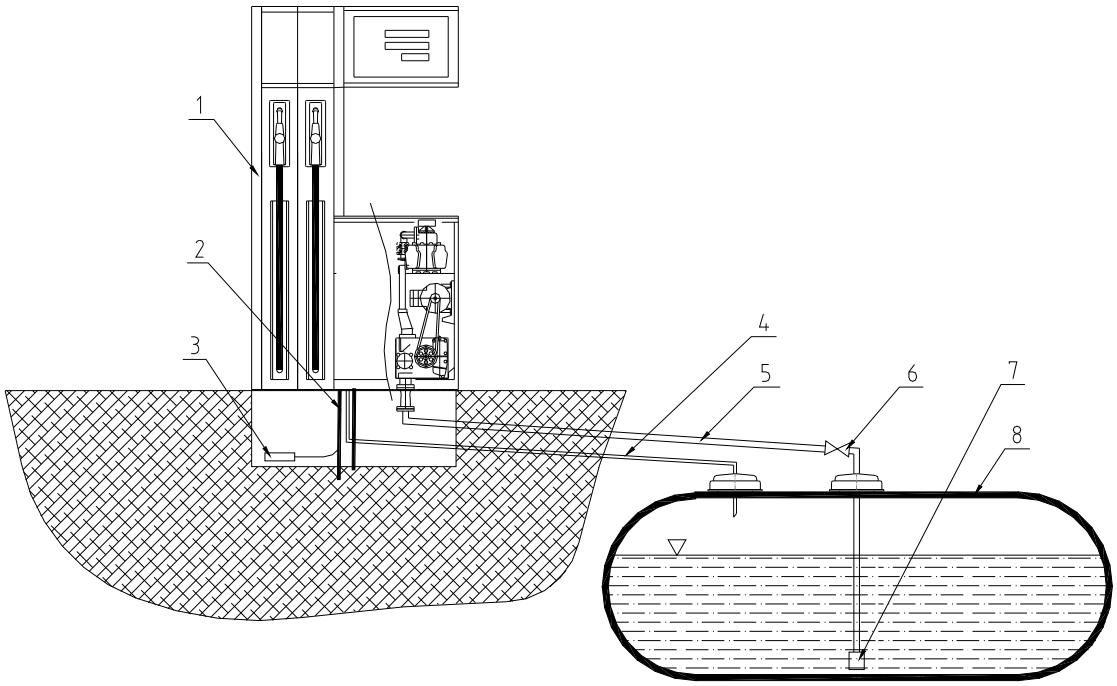



*Figure 5 – Fuel dispenser installation – underground tank*

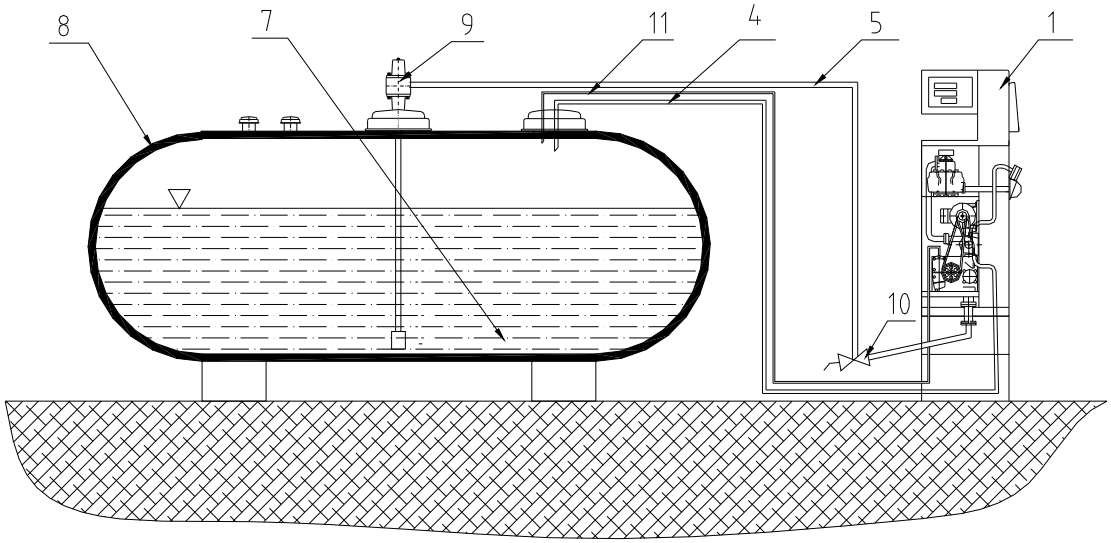



*Figure 6 – Fuel dispenser installation – aboveground tank*

| Pos. | Description | Pos. | Description |
|---|---|---|---|
| 1 | Dispenser | 6 | Check valve |
| 2 | Electrical wiring and communication line | 7 | Suction strainer (without check valve) |
| 3 | Liquid sensor installed on leakage sump bottom | 8 | Fuel tank |
| 4 | Piping of return vapour removal (recovery) | 9 | Pressure relief valve |
| 5 | Suction fuel piping | 10 | Discharge and stop valve |
| | | 11 | Return pipe from the dispenser separator |

**ATTENTION for aboveground tanks**

The dispenser pumping monoblock is designed with permanently open air-separator into vent chamber built up by the room in the monoblock body and room of the monoblock cap. On upper side of the cap is DN6 connection for pipe of separated air. To prevent fuel leakage or lock of check valve in time when the dispenser is out of order, to prevent overfill of the vent chamber of the pumping monoblock and medium leakage in the inner room of the dispenser and its surroundings, **it is necessary to interconnect separator outlet of the pumping monoblock with fuel tank**. Pipe interconnection is possible to carry out by pipe Ø 10 x 1 (DN8) connected to the pipe connection DN8. The pipe connection is screwed through sealing in the opening M12x1.5 in upper part of the monoblock cap. Pipe outlet is necessary to lead on into fuel tank cap via pipe connection DN8 **(see Figure 7)**.

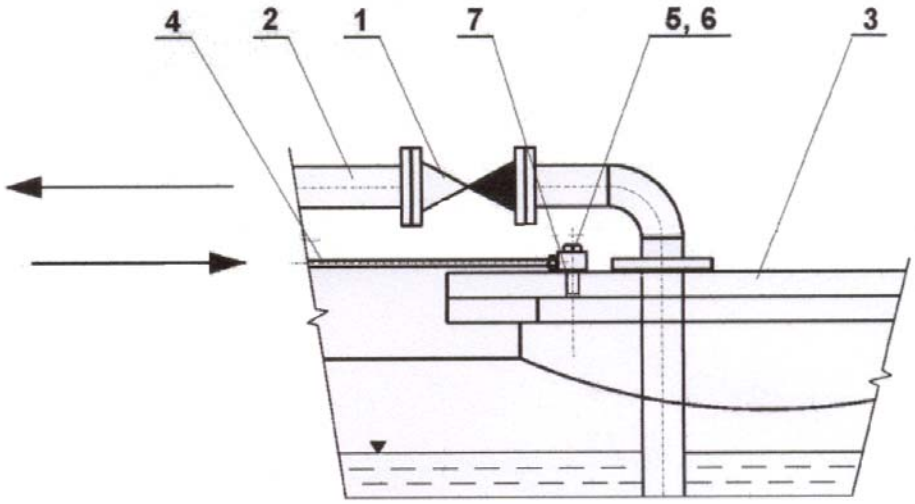



*Figure 7 – Example of suction piping - interconnection between dispenser and aboveground tank*

| Pos. | Description |
|---|---|
| 1 | Pressure check valve (DN according to the suction pipe) |
| 2 | Suction pipe from tank DN40 (Q = 40 $dm^3.min^{-1}$) or D50 (Q = 80-130 $dm^3.min^{-1}$) |
| 3 | Tank cap |
| 4 | Pipe Ø 10 x 1 (DN8) for air outlet from the dispenser separator |
| 5 | Pipe connection DN8 |
| 6 | Sealing ring 14 x 18 |
| 7 | Sealing ring 12 x 16 |

## 2.3.5. Piping System

The fuel dispenser manufacturer recommends carrying out the piping system standardly, i.e. the separate piping leads into the relevant fuel tank from each pump.

**NOTE**

There is also so-called backbone piping system available, i.e. more dispensers (pumps) are connected to a single supply piping from one tank. The dispenser manufacturer **does not recommend** the backbone piping system due to possible instability, which can occur during fuel suction from the tank. If the designer nevertheless selects the backbone piping system, then the dispenser manufacturer requests to incorporate the disk valves **(C09 DN32 type)** into the suction piping which can separate individual dispensers. The disk valves are manufactured by the company Armatury Group a.s. Kravaře.

### 2.3.6. Dispenser Installation According to Environmental Effects

**ATTENTION**

Dangerous zones are determined according to ČSN EN 60079-10 round the dispenser.

Combined dispensers **may not be** placed in the danger zone. Electric counters, used in these dispensers are of uncased version, are placed in the zone without explosion hazard and separated from all other zones by the partition of type 1 according to ČSN EN 13617-1.

### 2.3.7. Pressure System

The dispenser(s) can be connected not only to the system with classic suction, when the fuel is sucked from the tanks by the pumps placed in the dispensers, but also to the **pressure system**, where the fuel is "pushed" into the dispenser directly from the tanks where the central pumps are installed (e.g. the RED JACKET system). Advantage of the pressure system is very quiet dispenser run; disadvantage is high demand to quality and tightness of the fuel piping. In case of the pressure system the dispenser is not equipped with the pumping monoblock. The fuel piping is connected through the breakaway valve installed under the dispenser. From here the fuel is led into the filter and distributed through the flow meters and control valves into the dispensing hoses and nozzles.

**CAUTION**

The fuel dispenser TATSUNO BENČ **is not equipped by the breakaway valve as standard** for the pressure system. The fuel inlet into the dispenser is realized by the union nut with the inner thread G1". Position of the inlet pipe can be seen in the Appendix I, where are two examples of interconnection.

The following supply cables must be led into the shaft under the fuel dispenser together with the conductor for grounding system connection:

- for feeding of three-phase electric motor feeding – the four-core cable **Y-JZ 4 x 1.5** or **CMSM 4B x 1.5** (the dispensers equipped with the vapour recovery – only suction pump electric motors are feeding by the cable)
- for switching of pump electric motors installed inside the tanks – the seven-core cable **Y-JZ 7 x 1** or **CMSM 7C x 1.5**
- for switching of LPG pump installed in the kiosk – the four-core **Y-JZ 4 x 1.5** or **CMSM 4B x 1.5**
- for feeding of counter and switching circuits of the dispenser – the five-core cable **Y-JB 5 x 1.5** or **CMSM 5C x 1**
- communication line – shielded cable **CY-JZ 5 x 0.75** or **CMFM 4D x 1**

Connection of the dispenser to the pressure system can be found in the Appendix I.

### 2.3.8. Satellite to Dispenser

The so-called satellite can be connected to the combined fuel dispensers. This is the additional dispensing point – the dispenser with a hose and a nozzle, installed on the opposite traffic island side. The satellite is used particularly for truck refuelling, when the both side tanks of truck can be filled simultaneously by the hoses of the main dispenser and satellite. The satellite dispenser is not equipped with any control electronics and hydraulic system and depends fully on the main dispenser. Figure of the satellite, its foundation plan and the base frame can be found in the Appendix F.

## 2.4. Mechanical Fuel Dispenser Mounting

The fuel dispensers are fixed to the special base frames by the anchor bolts delivered with the dispenser. The dispenser base frame is not part of the delivery, but can be ordered additionally. The base frame is seated into the concrete on the island, then the front and back dispenser covers are removed, the dispenser is placed on the base frame and fixed by fixing screws.

The fuel dispenser is then connected to the suction piping by the connection suction piece (flexible type) – the integral part of the dispenser delivery.

The base frames and foundation plans of all dispenser type models with marked position of the suction piping and piping for recovery of petrol vapours from the dispenser can be found in the Appendix F. The discharge vapour recovery piping is connected with the piping cap G 1".

**NOTE**

The cap G 1" is the integral part of the dispenser delivery. The **recovery piping must end by the internal thread G1".**

**CAUTION**

**LPG must be forced out of the dispenser and piping (e.g. by disassembly) by the nitrogen or inert gas. Forcing out by air or oxygen is strictly prohibited!**

## 2.5. Fuel Dispenser Electric Wiring

Electric wiring of dispensers TATSUNO BENČ requires protection against contact voltage (according to ČSN 33 2000-4-41 „Electric Engineering Regulations – Electric Installations of Buildings - Part 4: Protection for Safety - Chapter 41: Protection against electric shock", published: February 2000, in force since: 2000.03.01, catalogue No.: 55509, Harmonization: Determined – Government Decree No. 163/2002 Coll., Bulletin - 2002.Z2) and laying of relevant electric cables for each fuel dispenser.

All dispensers shall be interconnected by the earth wire and connected to the grounding system. The green and yellow conductor, section of min. **4 mm²**, or special ribbon conductor can be used as the earth wire. The earth wire must be connected to the central grounding terminal of the dispenser placed on the foundation (screw M10), marked by the grounding graphical symbol.

**ATTENTION**

All electric cables must be resistant to petrol vapours and must have good insulting properties, because they are placed in aggressive explosion atmosphere for a long time period. They also must be resistant to temperatures within the limits -40°C to +70°V and be in accordance with the standard ČSN EN 13617-1. For these purposes the manufacturer recommends the cables FABER KABEL of Y-JB, JZ and CY-JZ, OZ types or cables CMSM and CMFM types. An example of dispenser electric wiring is mentioned in the **Appendix G**.

**NOTE**

Ends of all cables entering the dispenser must be long enough for easy installation (cable termination in the distribution box) – each cable must end at least **3 m** above the ground.

From the point of applied voltage and function, the cables can be classified into power (feeding) and signal ones.

**Power cables:**

- feeding of LIQUID FUEL pump and suction pump electric motors
- LPG pump switching
- feeding of counter and switching components

**Signal cables:**

- communication line
- additional service lines (pulse outlets, motor interlocking, etc.)

### 2.5.1. Feeding of Pump and Suction pump Electric Motors

Feeding of pump and suction pump electric motors of all dispenser type models is carried out by the 4-core cable **Y-JZ 4 x 1.5**, distributed from the main switchboard in the kiosk to each particular dispenser into the distribution box (see Appendix G). In the switchboard the cable is connected to the fuses and switch. Switching of separate pump and suction pump pump motors is done by contactors inside the dispenser.

The combined dispensers are equipped by the connectors and each motor is protected by the thermal current protection in the dispenser. Switching of pump and suction pump motors is carried out so that max. two pump and two suction pump motors are at any time connected to the supply power cable.

| Marking of conductors Faber cable Y-JZ 4 x 1.5 | | |
|---|---|---|
| **marking** | **colour** | **description** |
| L1 | black 1 | phase 1 |
| L2 | black 2 | phase 2 |
| L3 | black 3 | phase 3 |
| PE | green and yellow | protective conductor |

*Table 3 – Feeding of pump and suction pump motors*

**ATTENTION**

It is recommended to use a special motor circuit breaker **PKZM 0-10** type, manufactured by the Moeller Klöckner company, for termination of the supply cable 3x400V in the switchboard. This circuit breaker serves as the switch and contains short circuit and thermal protection. After installation into the switchboard door, it is possible to complete this breaker by the control head (IP65) with extended shaft - RH-PKZO type.

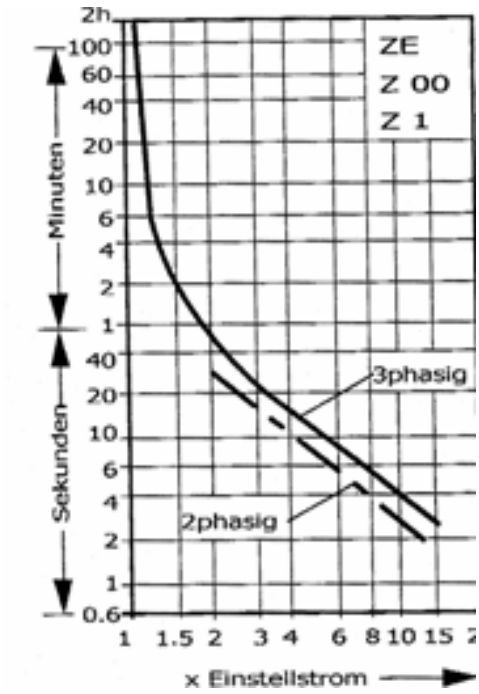



*Figure 8 – Current protection tripping characteristics of type ZE Moeller Klöckner*

**NOTE**

Motor contactors **DIL EEM-10** and **DIL EM-10-GI** with thermal current protections of type **ZE-2, 4** and **ZE-0.6,** manufactured by the Moeller Klöckner company, eventually motor circuit breakers of **PKZM 0-0.4** type of the same manufacturer, are used for switching of pump and suction pump motors in multi-product fuel dispensers. Figure 8. shows the tripping characteristics of used current protections of the ZE type of the Moeller Klöckner company.

### Types of used electric motors

The following four electric motor types are used for all combined dispensers:

| Pump electric motor variant 1 | Pump electric motor variant 2 | Suction pump electric motor - variant 1 | Suction pump electric motor - variant 2 |
|---|---|---|---|
| asynchronous motor | asynchronous motor | asynchronous motor | asynchronous motor |
| type 1MA7083-4BA10 | type V80 TL4PR | type ERFY 0.09/2-71 | type BA240TRII AR-R |
| 230/400V; 50Hz | 230/400V; 50Hz | 230/400V; 50Hz | 230/400V; 50Hz |
| current 2.05 A | current 2.2 A | current 0.35 A | current 1.0 A |
| power input 0.75 kW | power input 0.75 kW | power input 0.12 kW | power input 0.37 kW |
| 1395 rpm | 1410 rpm | 2765 rpm | 2850 rpm |
| Ia/In = 4,8 | with thermal protection | Ia/In = 4,2 | with thermal protection |
| IP 55 | IP54 | IP 54, VDE 0530/84 | IP 54 |
| T3, $t_E$ = 16 sec | T3 | T3, $t_E$ = 40 sec | T3 |
| cos φ = 0,75 | cos φ = 0,72 | cos φ = 0,78 | cos φ = 0,75 |
| Ex II 2 G EEx e II T3 | Ex II 2G EEx d II B T3 | EEx e II T3 | Ex II 2G EEx d IIB T3 |
| PTB 01 ATEX 3259 | CESI 03 ATEX 023X | PTB Nr. EX-80/3422 | ISSeP02 ATEX 029 |
| Manufacturer: Siemens Elektromotory sro | Manufacturer: RAEL motori elettrici S.r.l. | Manufacturer: ATB Flender | Manufacturer: ELNOR motors n.v. |

*Table 4 – Types of used electric motors*

**ATTENTION**

When connected, check the motor for correct direction of rotation (according to the marked arrow!). See fig. 9.

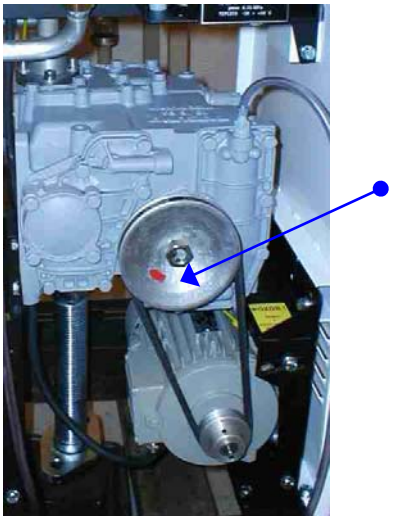


*Figure 9 – Direction of the pump motor rotation*

### 2.5.2. Switching of LPG Pump Connector

Switching of the pump for liquid gas at combined dispensers is carried out either by 3-core cable **Y-JB 3 x 2.5** (dispensers with LPG module equipped with one common LPG inlet - MOD2012.SMD/LPG or MOD2012.STD/LPG ), or by 4-core cable **Y-JZ 4 x 1.5** (dispensers with LPG module equipped with two independent LPG inlets - MOD2022.STD/LPG ). The cable from the main switchboard in the kiosk is led to each fuel dispenser into the distribution box (see Appendix G).

| Marking of conductors in cable Faber Kabel Y-JZ 4 x 1.5 | | |
|---|---|---|
| **marking** | **colour** | **description** |
| SL1 | black 1 | switching phase for LPG pump |
| SL2 | black 2 | - unused - |
| SN | black 3 | switching voltage led from the switchboard (max. 250V/1A) |
| PE | green and yellow | protective conductor |

*Table 5 – Switching of one LPG pump*

| Marking of conductors in cable Faber Kabel Y-JZ 4 x 1.5 | | |
|---|---|---|
| **marking** | **colour** | **description** |
| SL1 | black 1 | switching phase for LPG pump No. 1 |
| SL2 | black 2 | switching phase for LPG pump No. 2 |
| SN | black 3 | switching voltage led from the switchboard (max. 250V/1A) |
| PE | green and yellow | protective conductor |

*Table 6 – Switching of two LPG pumps*

**NOTE**

Relay or motor contactors in the LPG dispensers are used for switching of the pump motor contactor. The switching voltage on contactor should not exceed value of 250V and the switched current value of 1A.

### 2.5.3. Feeding of Electronic Counter and Switching Elements

The stabilized feeding of electronic counter and non-stabilized feeding of switching elements is separated in all dispensers, where the electronic counter PDE/PDEX is used.

Feeding of the counter and switching circuits is done by the 5-core cable **Y-JB 5 x 1.5**, which is always led from the main switchboard in the kiosk on the first module in the distribution box (wiring of the distribution boxes is mentioned in the Appendix G). This cable contains stabilized counter feeding and non-stabilized switching element feeding (eventually auxiliary heating units).

| Marking of conductors in cable Faber Kabel Y-JB 5 x 1.5 | | |
|---|---|---|
| **marking** | **colour** | **description** |
| Ns | grey (light blue) | zero conductor of stabilized counter feeding |
| Ls | brown | phase 230V of stabilized counter feeding |
| Nt | blue | common zero conductor of lighting and switching elements feeding |
| Lt | black | phase 230V of switching elements feeding |
| PE | green and yellow | protective conductor |

*Table 7 – Feeding of computer and switching elements*

**Feeding of switching elements 230V** is led into the main switchboard, where it is connected to the phase 230V through the circuit breaker (230V, 2A).

**Feeding of counter** is led from the dispenser into the main switchboard, where it is connected to the common bus for all dispensers through the circuit breaker 230V (230V, 2A). From here feeding of all dispensers is led into the stabilised standby source, which will feed the dispenser counter for min. 3-5 minutes in case of power failure. The stabilized source is fed by 230V through the circuit breaker (230V, 10A).

**NOTE**

It is necessary to separate zero conductors in the switchboard from switching element feeding and from stabilized counter feeding (separate null bridge).

## 2.5.4. Communication Line

The communication line serves for remote dispenser control in the so-called automatic mode (i.e. the dispenser is controlled remotely by the console or counter). The line need not be installed if the dispenser is operated in the manual mode only.

**ATTENTION**

For the communication line at least the four-core shielded communication cable of the min. conductor cross-section of 0.5 mm² must be used!! Cable sheath must be self-extinguishing and resistant to petrol vapours. The 4-core shielded cable **Faber Kabel CY-JZ 5x 0.75** can be used as the communication line; the cable is led from the operator's workplace in the kiosk into the communication distribution boxes of dispensers (wiring of communication boxes for different electronic counter types is mentioned in the Appendix G.).

### Communication Line Wiring

The method of wiring of the communication line from the kiosk to the dispenser and its connection into the communication distribution box depends on the type of the counter or data communication interface, used in the dispensers. The electronic counter **PDE or PDEX** of the company TATSUNO-BENČ EUROPE a.s. is installed as standard in all combined dispensers. It is possible to use counters eventually communication interface **ADP** and **ADPMPD** of the company Beta Control, or data communication interface **PUMA LAN** of the company Gilbarco Veederoot. If the interface **IFSF-LON** or **DART** is used for communication with the dispensers, then the connection and wiring of the distribution box is identical with connection for the PDE counter.

| Marking of conductors in the cable Faber Kabel CY-JZ 5x 0.75 for counter PDE, interface IFSF-LON or DART | | |
|---|---|---|
| **marking** | **colour** | **description** |
| A | black 1 | communication line A (+5Vss), or NET A (IFSF LON) |
| B | black 2 | communication line B (-5Vss), or NET B (IFSF LON) |
| - | black 3 | - unused - |
| - | black 4 | - unused - |
| - | green and yellow | - unused - |
| ST | shielding | cable shielding |

*Table 8 – Communication cable for PDE counter, eventually interface IFSF-LON or DART*

| Marking of conductors in the cable Faber Kabel CY-JZ 5x 0.75 for communication interface ADP or ADPMPD | | |
|---|---|---|
| **marking** | **colour** | **description** |
| D(-) | black 1 | communication line DATA( -) |
| D(+) | black 2 | communication line DATA(+) |
| 0V | black 3 | signal ground |
| - | black 4 | - unused - |
| - | green and yellow | - unused - |
| ST | shielding | cable shielding |

*Table 9 – Communication cable for the counter or interface ADP and ADPMPD*

| Marking of conductors in the cable Faber Kabel CY-JZ 5x 0.75 - communication interface Puma LAN | | |
|---|---|---|
| **marking** | **colour** | **description** |
| TX | black 1 | communication line TX |
| RX | black 2 | communication line RX |
| AM | black 3 | signal Automatic/Manual |
| 0V | black 4 | signal ground |
| - | green and yellow | - unused - |
| ST | shielding | cable shielding |

*Table 10 – Communication cable for interface PumaLAN*

| Marking of conductors in the cable Faber Kabel CY-JZ 5x 0.75 - communication interface ER4 (Hectronic) | | |
|---|---|---|
| **marking** | **colour** | **description** |
| YA | black 1 | communication line TX |
| ZA | black 2 | communication line RX |
| YB | black 3 | signal Auto/Manual |
| ZB | black 4 | signal ground |
| - | green and yellow | - unused - |
| ST | shielding | cable shielding |

*Table 11 – Communication cable for interface PumaLAN*

There are two basic methods of the communication line wiring between single fuel dispensers and control unit (computer) in the filling station:

a) **Series connection** (dispensers with counter or data communication interface PDE, ADP, ADPMPD, IFSF-LON, DART) – the communication cable is led from the control computer in the kiosk (service panel) into the communication distribution box of the first dispenser. From here the cable is led into the distribution box of the next dispenser, etc. until all dispensers in the filling station are interconnected. Only one communication line is necessary for interconnection of all dispensers in the station.

b) **Star ("Y") connection** (dispensers equipped with the counter or data communication interface PUMALAN or ER4 Hectronic) – the communication cable is led from the control computer in the kiosk (service panel, concentrator) star-like into the communication distribution box of all dispensers. The number of communication lines, necessary for interconnection of all dispensers, equals to the number of dispensers in the filling station.

### 2.5.5. Service Lines

The service lines serve for special purposes. The lines are not necessary for the dispenser operation, but are used if certain dispenser functions need to be controlled remotely or if certain signals have to be led out of the dispenser. Necessity of installation of the service lines shall always be consulted with specialists of the company TATSUNO-BENČ SERVICE s.r.o. (see section 5). Multi-core shielded cables CY-JZ eventually CMFM (1.5 $mm^2$) are recommended for the service lines.

## 2.5.6. Characteristics of Cables

| Cable type | Function | Number of cores | $D_{nom}$ [mm] | Colour version of cores |
|---|---|---|---|---|
| **Faber Kabel Y-JZ 4 x 1.5** | motor feeding switching of two LPG pumps | 4 | 8.1 | ZŽ, 3 x Č |
| **Faber Kabel Y-JB 5 x 1.5** | counter feeding | 5 | 9.1 | ZŽ, Č, M, Š, H |
| **Faber Kabel Y-JZ 7 x 1.0** | pump switching in the tanks (pressure system) | 7 | 8.3 | ZŽ, 6 x Č |
| **Faber Kabel Y-JZ 4 x 1.5** | LPG pump switching | 4 | 8.1 | ZŽ, 3 x Č |
| **Faber Kabel CY-JZ 5x 0.75** | communication line | 5 | 9.4 | ZŽ, 4 x Č, shielding |

*Table 12 Characteristics of recommended cables*

| Cable type | Possible equivalent cables | Number of cores | Rated current (A) | Colour version of cores |
|---|---|---|---|---|
| **Y-JZ 4 x 1.5** | CMSM 4B x 1.5 | 4 | 17 | ZŽ, Č, H, Č |
| **Y-JB 5 x 1.5** | CMSM 5C x 1.5 | 5 | 15 | ZŽ, 3 x Č, SM |
| **Y-JZ 7 x 1.0** | CMSM 7C x 1.0 | 7 | 11 | ZŽ, 5 x Č, SM |
| **CY-JZ 5x 0.75** | CMFM 4D x 0.5 | 4 | 16 | Č, Č, H, SM |

*Table 13 Possible equivalent cables*

**RECOMMENDATION** The pulse overvoltage can occur in any line due to lightning – up to the distance of several kilometres or due to industrial activities. The pulses arisen by lightning induction are quite enough for full destruction of the electronic unit. For these reasons the advanced countries usually apply the overvoltage protection, leading the overvoltage pulse energy away into the earthing conductor, thereby they protect the unit mentioned. Therefore the manufacturer of the fuel dispensers recommends protecting the main switchboard (eventually the secondary switchboard) feeding the fuel dispensers, electronic devices (computer, cash desk, etc.) and data lines by overvoltage protection and lightning arresters.

**RECOMMENDATION**

In order to provide trouble-free operation of the fuel dispensers **it is necessary** to secure the stabilized dispenser supply by the standby source UPS. Power supply failures, heavy disturbances or voltage drops in peak hours (particularly during winter season) are very frequent phenomena in our power supply network. All these phenomena can be eliminated by using of a proper standby source UPS. There are two models of standby source available and suitable for the fuel dispensers in our market:

a) UPS of line-interactive type (price range for 600VA UPS is ca 7 000 to 15 000 CZK)

b) UPS of on-line type (price range for 600VA UPS is ca 20 000 to 50 000 CZK)

UPS of line-interactive type is enough for stabilisation in the filling stations connected to a very stable power supply network (without any voltage drop and without any disturbances). In other cases the ON-LINE type UPS has to be applied. Disturbances, voltage drops or failures can result in frequent blocking of the dispensers, problems with counter/dispenser communication, counter failures (data loss), etc.

**IMPORTANT NOTICE**

For trouble-free operation of the fuel dispensers the signal cables **have to be** separated thoroughly from the power supply cables. Parallel lying of power and signal cables without any separation results in disturbances undesirable parasite phenomena, which may cause problems with fuel dispenser control or even full damage of electronic units inside the dispensers and in the kiosk. Therefore it is necessary to prevent any crossing or parallel lying (in a single harness) of the signal and power cables. Separate "channels" (lead through, metal tubes) for power and signal cables are the best solution. **The manufacturer is not responsible for the damages caused by unsuitably designed cable interconnection!!!**

# 3. Basic Functions and Dispenser Setting

Setting of the fuel dispensers is performed by the set of parameters, by which functional dispenser parameters can be controlled, mode and behaviour of the dispenser in different situations can be changed principally. Values of the parameters can be monitored and changed either by the remote IR controller or by the buttons (functional keys) placed directly on the counter or on a simple keyboard (the integral part of the counter).

## 3.1. PDE and PDEX Counter

The PDE counter with newer variant PDEX, manufactured by the company TATSUNO-BENČ EUROPE a.s., is set by the remote IR controller (marked PDERT). The setting mode serves for monitoring and change of the parameters and provides the following operations:

- reading of non-resetable electronic volume and cash amount totalizers of all dispensing hoses
- reading and reset of daily electronic volume and cash amount totalizers of all hoses
- setting of unit product prices (manual mode)
- setting of different functional parameters of the dispenser

The setting mode can be recalled on the dispenser by under mentioned method only if the dispenser is at rest (completed dispensing, all nozzles are in the boots). There are two setting modes available:

- **Operator mode** (specified for the filling station operators) – the operator can only read values of electronic totalizers and values of basic dispenser parameters. It is not possible to reset or change their values.
- **Manager mode** (specified for the filling station manager) – the manager is authorised to read the values, reset daily totalizers and set basic operating parameters of the dispenser. The manager access password is necessary to enter for working in the manager mode.

### 3.1.1. Remote Dispenser Control

A special remote IR controller (PDERT-4O – see Figure 10) must be used for reading dispenser values (totalizers), change of the dispenser mode or for setting of different counter parameters on the dispensers equipped by the **PDE counter**. Remote controller keyboard has the following keys and their layout:

Controller keyboard has the following keys layout and their function:

- operating state:

| | |
|---|---|
| **<C>** | Release of dispenser side after payment or failure. |
| **<0>** | Release of whole dispenser (i.e. both sides) after payment or failure. |
| **<1>** | Preset - pressing of preset key No.3 (10 litres) |
| **<2>** | Preset – pressing of preset key No.4 (1 litre) |
| **<4>** | Preset – pressing of preset key No.1 (CZK 100) |
| **<5>** | Preset – pressing of preset key No.2 (CZK 10) |
| **<6>** | Cancel of preset on one dispenser side (preset key No.5 - Cancel) |

**<7>** Dispenser lighting/heating ON.
**<9>** Dispenser lighting/heating OFF.

- Start of setting modes:

**<R>** activating and deactivating of the manager mode
**<S>+<R>** activating of the operator mode

- PDE counter parameter reading:

**< ▶ >** Switching to next parameter.
**< ◀ >** Switching to previous parameter.
**<+>** Switching to next parameter item.
**<->** Switching to previous parameter item.
**<E>** Change of value of the displayed parameter (if the operation is permitted).
**<0>...<9>** Direct switching to the parameter with preset number.
**<R>** End of the manager mode.

- Change of parameter value and entering of access password:

**<0>...<9>** Entering of value of the just edited digit and switching to the next.
**<+>** Increase of just edited parameter digit.
**<->** Decrease of just edited parameter digit.
**< ▶ >** Switching to editing of the next parameter digit.
**< ◀ >** Switching to editing of the previous parameter digit.
**<E>** End of change and storing of a new value.
**<C>** End of change without storing of a new value.

*Figure 10 - PDERT-40 remote controller*

### 3.1.2. Setting of Parameters on Dispenser with Fuel Volume Display

The process of setting is similar to that of the classic three-line display, only functions of certain keys on the remote controller keyboard can be different.

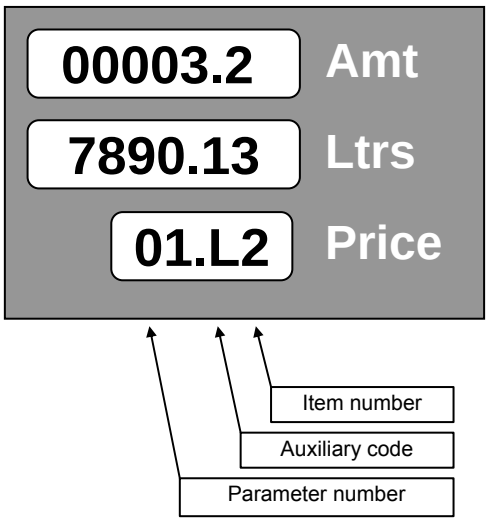
Basic principles of setting in the manager and service mode:

1. Pressing the key <R> enters the manager mode. The word „CODE“ appears for ca 1 second on the display. Now the password must be entered. After entering the correct password and confirmation by the key <**E**> the volume display will show „-0“ and the dispenser waits for entering the relevant parameter digit.
2. Switching between parameters – by the keys <**>**> and <**<**>, between sub-parameters - by <**+**> and <**-**>
3. To display value of the parameter on the line „Litres“ – press the key <**1**>. To display value of the parameter on the line „Price“ – press the key <**2**>. The key <**C**> again displays the number of the parameter (i.e. displays the line „CZK/litre“ )
4. Change (editing) of parameter value by the key <**E**>
5. Mode exit by the key <**R**>

Browsing of the parameters (totalizers) in the operator mode is done in the same way. When pressing the key <**S**> <**R**>, the first parameter 01 will appear automatically. Switching between parameters is done by the <>> and <<>, between sub-parameters by <**+**> and <**-**>. Operator mode exit is done by the pressing the key <**R**>.

### 3.1.3. Data Monitoring in Setting Mode

All data in the setting mode are displayed on the dispenser display. When controlling by the remote controller, the data are displayed on the dispenser side, which the setting mode was recalled from by the controller. Individual parameters are displayed as follows:




Parameter number: 01
Item number: 2
Auxiliary code: L
Parameter value: 327890,13

*Figure 11 – Example of parameter displaying on the display*

### 3.1.4. Operator Mode

The operator mode is started by pointing to the dispenser display by the IR remote controller (at the distance of ca 1 m from the dispenser) and by pressing the key <**S**> and then the key <**R**>. **All nozzles must be locked in the boot !!**

After the operator mode is recalled, value of the first parameter is displayed. Switching to the next parameters and their items is carried out by the keys <**>**> and <**+**> (see section 3.1.1.).

The operator mode enables to display, **but not change** the following parameters:

| Param. | Description |
|---|---|
| 01 | Non-resetable totalizers |
| 02 | Daily totalizers |
| 03 | Unit fuel product prices |
| 04 | Current time and date |
| 05 | Program version and check total |
| 06 | History of failures |
| 07 | History of dispensing |

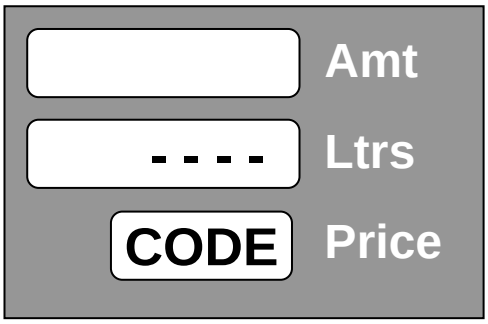
*Table 14 – List of operator mode parameters*

The operator mode is ended by pressing the key **<R>** on the remote controller. The mode is also ended automatically, if no key is pressed for 60 seconds.

### 3.1.5. Manager Mode

The manager mode is started by pointing to the dispenser display by the IR remote controller (at the distance of ca 1 m from the dispenser) and by pressing the key <**R**>. **All nozzles must be locked in the boot !!**

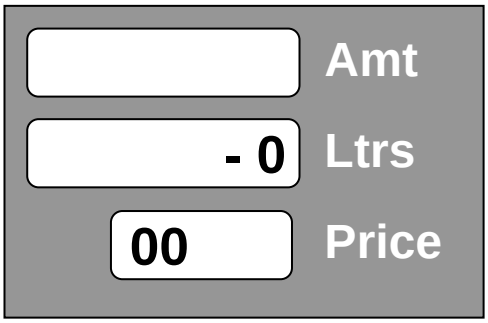
After the manager mode is recalled, the display shows the call for entering the 4-digit access password:




The entered digits are displayed as dashes for reason to have the password secret. The manufacturer has set the access password: „1111“.

*Example:*

Press the keys <**1**><**1**><**1**><**1**> and <**E**>




After the valid access password entering, the display shows the parameter number 00; and by pressing the key <**E**> is possible to continue by automatic switching to the parameter No.01, or it is possible to enter the **parameter number** and confirm by the key <**E**> for direct switching to the requested parameter. After the manager code is recalled, value of the first parameter will be displayed.

The manager mode enables to display and change (set) the following parameters:

| Param. | Description |
|---|---|
| 01* | Non-resetable totalizers |
| 02 | Daily totalizers |
| 03 | Unit fuel product prices valid in the dispenser manual mode |
| 04 | Current time and date |
| 05* | Program versions and CRC parameters (check totals) |
| 06* | History of failures |
| 07* | History of dispensing |
| 08 | Access password |
| 09* | History of maintenance |
| 10 | - unused - |
| 11 | - unused - |
| 12 | Dispenser operating mode |
| 13* | Statistics of failures |
| 14* | Current operating temperature |
| 15 | Reset of daily totalizers |
| 16 | Operating check number |
| 17 | - unused - |
| 18 | Text messages of LCD alphanumeric display |
| 19 | Displaying of display segment error |
| *Parameters marked by asterisk (*) can be browsed only in the manager mode, not set* | |

*Table 15 – List of manager mode parameters*

The manager mode is ended by pressing the key **<R>** on the remote controller. The mode is also ended automatically, if no key is pressed for 60 seconds.

### 3.1.5.1. Non-resetable Volume Totalizers (Code 01)

The electronic volume totalizers of all hoses (meters) are stored in electronic counter memory. These totalizers are **non-resetable** and show how many litres were dispensed by single/all dispensing hoses.

| item number | description |
|---|---|
| A1 to A7 | volume dispensed by the hose A1 to A7 (in litres) |
| B1 to B4 | volume dispensed by the hose B1 to B4 (in litres) |

*Table 16 – Non-resetable totalizers (code 01)*

### 3.1.5.2. Daily Totalizers (Code 02)

The electronic daily totalizers of all hoses (meters) are stored in electronic counter memory. **These totalizers can be reset at any time (see parameter 15)**. Daily totalizers show what fuel volume or cash was dispensed by single dispensing hoses since the latest resetting.

| item number | description |
|---|---|
| A L1 to A L7 | volume dispensed by the hose A1 to A7 (in litres) |
| A C1 to A C7 | amount dispensed by the hose A1 to A7 (in currency) |
| B L1 to B L4 | volume dispensed by the hose B1 to B4 (in litres) |
| B C1 to B C4 | amount dispensed by the hose B1 to B4 (in currency) |

*Table 17 – Daily totalizers (code 02)*

### 3.1.5.3. Fuel Product Unit Prices (Code 03)

This function enables to display and set current unit prices of all fuel products (i.e. prices per 1 litre of fuel). These fuel prices are valid only in the case when the dispenser is in the manual mode.

| item number | description | default setting |
|---|---|---|
| 1 to 7 | unit price of product 1 to 5 | 0,00 CZK/l |

*Table 18 – Unit prices of fuel products (code 03)*

If the fuel dispenser (counter) is connected to the control system, then the price is updated from the control system by the data communication line before every dispensing.

### 3.1.5.4. Current Time and Date (Code 04)

This function enables to display and set the current day and time.

| item number | description |
|---|---|
| 1 | date in the format DDMMYY (day, month and year) |
| 2 | time in the format HHMMSS (hours, minutes and seconds) |

*Table 19 – Current time and date (code 04)*

Setting of the time and date is valid also after switching off the dispenser feeding (max. 100 hours).

### 3.1.5.5. Displaying of Program Version and Check Totals (Code 05)

The function displays the number of the program version of the dispenser counter and number of check totals.

| item number | description |
|---|---|
| 1 | Program version loaded in the dispenser counter |
| 2 | Metrological check total |
| 3 | Program check total |
| 4 | Check total of the service parameters P20-P99 |
| 5 | Check total of the temperature and volume correction equipment |
| 6 | Time and date of the program compilation |

*Table 20 – Program version and check totals (code 05)*

The metrological, program and temperature correction equipment (PDEINP) check totals are checked after switching on; the parameter check total is checked all the time every second. If the calculated CRC is the same as the loaded one, the value 0 shows on the display first line (amount). If the calculated CRC is different, its value shows there. In the case of the temperature correction (without connection of the temperature correction unit (PDEINP) together with parameter P47≠ 0) the letter E appears on the first line of the display (amount).

If the metrological program CRC differs from loaded one after counter switching ON then the display shows E13 after counter test ending and it is impossible to pump.

If the temperature correction CRC differs from loaded one after counter switching on (or without connection of the temperature correction unit (PDEINP) together with parameter P47≠ 0), then the display shows E14 after counter test ending and it is impossible to pump. The temperature correction CRC is displayed only in the manager mode!!!

### 3.1.5.6. Displaying of Latest Error Conditions of Dispenser (Code 06)

The function serves for displaying of the history of the latest ten error codes of failures, occurred on the dispenser.

Table of error messages is mentioned in the Appendix D.

| Aux. code | item number | description |
|---|---|---|
| A | 0 | code of the last (tenth) error of the dispenser on display side A |
| B | 0 | code of the last (tenth) error of the dispenser on display side B |
| A | 1 | code of the last but one (ninth) error of the dispenser on display side A |
| B | 1 | code of the last but one (ninth) error of the dispenser on display side B |
| … | … | … |
| A | 9 | code of the last (leading) error of the dispenser on display side A |
| B | 9 | code of the last (leading) error of the dispenser on display side B |

*Table 21 – Displaying of error conditions of the fuel dispenser (code 06)*

When pressing the key <E> the display shows time and datum of error message occurring (Figure 12).

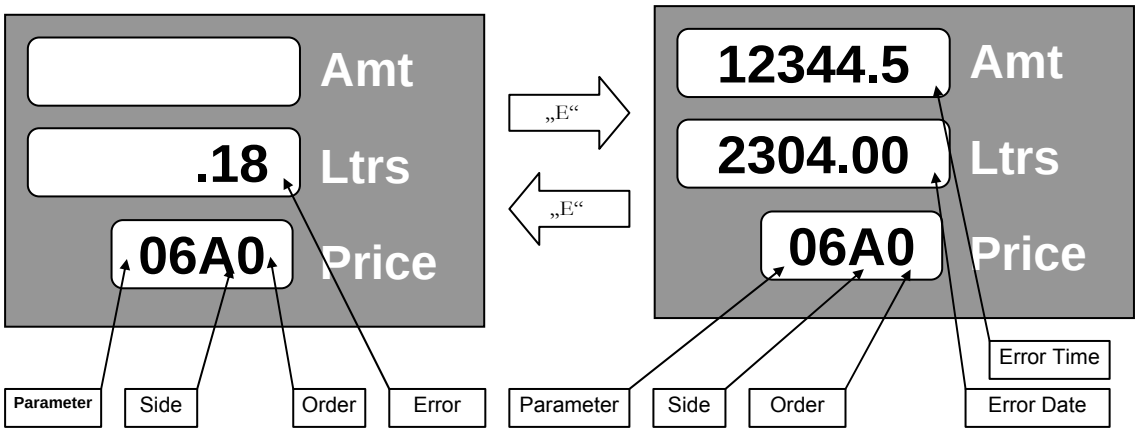



*Figure 12 – Example of the displaying of error condition history (parameter 06)*

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### 3.1.5.7. Displaying of Dispensing History (Code 07)

The function serves for displaying of the history of the latest ten dispensing transactions (on each side) realized on the dispenser. This parameter has following data layout on the display:

When pressing the key <E> the display shows time and datum of transaction/refuelling completing (Figure 13).

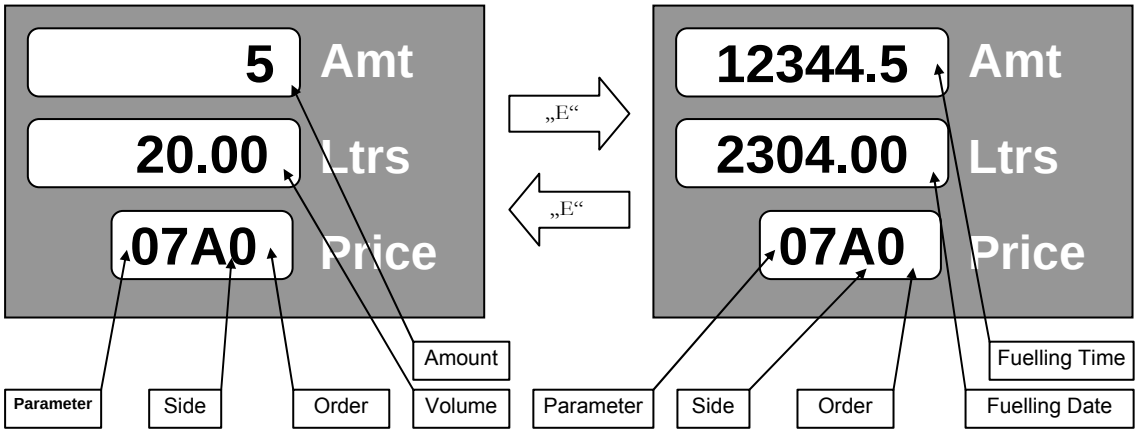



*Figure 13 – Example of displaying of transaction history (parameter 07)*

| aux. code | item number | description |
|---|---|---|
| A | 0 | last transaction (tenth) on display side A |
| B | 0 | last transaction (tenth) on display side B |
| A | 1 | last but one transaction (ninth) on display side A |
| B | 1 | last but one transaction (ninth) on display side B |
| … | … | … |
| A | 9 | last (leading) on display side A |
| B | 9 | last (leading) on display side B |

*Table 22 – Displaying of the dispensing history (code 07)*

The first and second lines contain price and dispensed volume of the transaction. The unit price of the transaction with the parameter number and the auxiliary code with the item number alternate on the third line. Number of the item means position in the history of transaction - 0 is the newest transaction (last), 9 are the oldest stored transaction. The auxiliary code means the dispenser side A - side A, B - side B. If the memory stack specified for the transaction history is empty (i.e. there is no transaction in the history ), „error“ appears on the display.

### 3.1.5.8. Access Password (Code 08)

This function enables to display and change the access password into the manager mode.

**Default setting from the manufacture is „1111".**

### 3.1.5.9. History of Maintenance (Code 09)

The function enables to display codes of the last ten service remote controllers by which the counter parameters were set by.

### 3.1.5.10. Dispenser Operating Mode (Code 12)

The function defines the type of dispenser operating mode.

| parameter value | Dispenser operating mode |
|---|---|
| 0 | automatic mode – ***default setting*** |
| 1 | - unused - |
| 2 | - unused - |
| 3 | manual mode |

*Table 23 – Dispenser operating mode (code 12)*

The value of the parameter can be from 0 to 4 **(the value 4 may be set for the credit version PDE only!)**

- If value of the parameter equals **0**, the dispenser is operated just in the automatic mode i.e. it is connected to the master counter (console). The dispenser is controlled by the counter fully (dispenser release, locking, setting of fuel prices, etc.). The error message E18 appears on the display after interrupted communication between the counter and dispenser.
- If value of the parameter equals **3**, the dispenser is operated just in the manual mode. The dispenser is independent fully (cannot be connected to the counter). Unit fuel prices may be set by the dispenser parameter No.3.

### 3.1.5..11. Error Statistics (Code 13)

The function serves for displaying statistics of the errors, which took place on the dispenser since the moment of initialization or resetting of the electronic counter. This parameter has different data arrangement on the display:

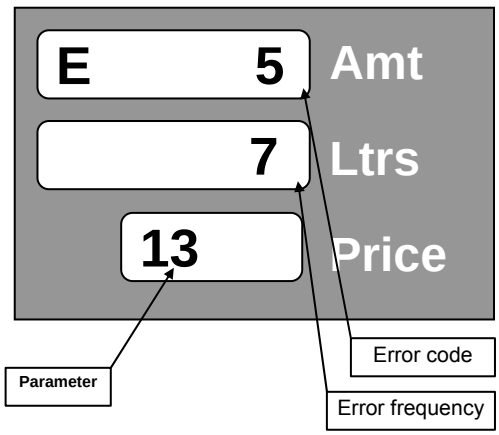



*Table 14 – Example of the error statistic displaying (parameter 13)*

The first and second lines contain the failure code and the frequency rate of this failure.

### 3.1.5.12. Current Operating Temperature (Code 14)

The function displays the current temperature measured by the temperature sensor installed on the processor board.

- line 1 (Amount) – operating counter temperature
- line 2 (Litres) – temperature of the product 1, 2, 3 or 4 (only if the temperature sensors are installed)

### 3.1.5.13. Daily Totalizer Reseting (Code 15)

The function serves for resetting of all daily totalizers (registers) of the dispensing hoses.
After setting the parameter value to **1** and after confirmation all totalizers will be **reset**.

### 3.1.5.14. Operating Check Number (Code 16)

The function serves for displaying of the 6-digit operating check number and for operating code entering.

- line 1 (Amount) – operating check number

### 3.1.5.15. Text Messages (Code 18)

If the dispenser is equipped with the proportional LCD display, the function enables to set time of displaying of the text messages on the display. The text messages may be divided into two groups:

- names of units of measure
- promotional messages

The parameter 18 serves for setting of the text messages displaying on the proportional LCD display (PDEDCU). The function has some sub-parameters:

- 0 = not display the text message
- 1 = display the text message (for sub-parameters 1 to 10, 22 and 23)
- 1....9 = time of the message displaying (for sub-parameters 11 to 19)

| Value of sub-parameter | description |
|---|---|
| 1-5 | - unused - |
| 6 | description of the dispensed amount unit (e.g. CZK, Euro, etc.) |
| 7 | description of the dispensed volume unit (e.g. L, Lt, Litres, etc..) |
| 8 | description of the price unit (e.g. CZK/L, CZK/Lt, etc.) |
| 9-10 | - unused - |
| 11-19 | promotional message |

*Table 24 – Setting of the displayed text messages (code 18)*

### 3.1.5.16. Displaying of Error of Display Segment Failure (Code 19)

The function enables/disables displaying of the segment error (Er1) by the processor.

| Parameter value | Description |
|---|---|
| 0 | Do not display the error of the display segment |
| 1 | Display the error of the display segment – ***Default setting*** |

*Table 25 – Displaying of the display segment failure (code 19)*

# 4. Operation

## 4.1. Instructions for Safe Operation

The dispenser is a complex device, which must fulfil a number of exacting functions. Before putting the dispenser into operation, the pressure test of the dispenser LPG module must be carried out together with the piping system by the pressure of 2.5 MPa including revision. There is also necessary to clean the tanks, piping and carry out check for the fuel purity before putting the dispenser into operation. Before activating the revision of the power distribution and check for the correct wiring have to be carried out to prevent electric shock and to provide explosion proofness.

*Figure 15 – No smoking*

*Figure 16 – No open fire*

*Figure 17 – No mobile phones*

**CAUTION**

- **Technical and technological equipment must conform to the approved conditions, which comprise the instructions for safe operation and maintenance as well as solution of emergency states. Snow fire extinguishers must be available close to the device in accordance with the fire safety rules.**
- **Only the persons that have provably passed the training may operate the LPG pumping station.**
- **The fuel dispenser is equipped with the "STOP button" (for emergency situations); the procedure in case of fire or emergency situation is determined precisely by the local operation rules – the operator must be trained conformably.**
- **The "STOP line" must be placed 5 m from the fuel dispenser as a minimum.**
- **LPG storage tanks, piping and the dispenser must be earthed, the earthing point for the road tanker must be marked explicitly.**
- **When refuelling, re-pumping and emptying LPG, the issued regulations have to be kept; arrival and operation in the specified filling station premises must be prevented according to the particular conditions.**
- **When selling and pumping LPG, it is necessary to keep the determined procedure; in case of any danger the device must be put out of operation immediately. When refuelling LPG, the operator of the LPG filling station must be also present; refuelling is prohibited during danger of atmospheric discharges and during storms.**
- **It is necessary to keep the preset deadlines for regular inspections and checks of the all installed units; intervention of the persons without relevant competence, capability a qualification into the installed technology, incl. the gas appliance, must be prevented safely.**
- **The operator may not carry out any repairs of the devices and change setting of the safety fittings. Regular maintenance and service may be carried out by the authorized service company only.**
- **The operator shall keep the device in workable and safe state; any defect or unusual phenomenon shall be notified to the service organisation immediately; in case of danger of delayed intervention the device must be out of operation.**

**CAUTION**

- **Smoking and open fire handling is prohibited in the vicinity of the dispenser.**
- **Smoking is prohibited also for the persons sitting in the car.**
- **It is prohibited to use the mobile phone in the vicinity of the dispenser.**
- **It is prohibited to dispense in the car tank if the motor is running.**

*Figure 18 – Information label – Liquid fuels*

**WARNING**

Fuel dispensers are harmless for the customer and operator from the hygienic point of view. It is suitable to protect the hands by gloves (e.g. made of eco-sheet) at carrying out routine maintenance and dispensing fuel. Polluted skin shall be washed by water and soap as soon as possible. Call the doctor if eyes are affected. When dispensing, do not breath petrol vapours.

## 4.2. Putting Dispenser into Operation

Switching the dispenser ON/OFF is carried out in the main switchboard of the filling station, where dispenser feeders are connected. Each dispenser has three power supply outlets in the main switchboard:

- feeding of pump and suction pump electric motors (3x400V)
- feeding of electronic dispenser counter (230V stabilized)
- feeding of valves, pump and suction pump electric motor switching (230V non-stabilized)

All these feeding points are protected by relevant circuit breakers, by which the dispensers are switched ON/OFF.

**RECOMMENDATION**

Switching the dispenser ON shall be done as follows:

1) Switching ON the standby source (UPS) placed in the kiosk (the green pilot lamp of the UPS lights up)
2) Switching ON the 230V circuit breaker for stabilized feeding of the electronic dispenser counter (all display segments are tested automatically and values of the last operation of dispensing will be displayed)
3) Switching ON the 230V circuit breaker for non-stabilized feeding of valves, LIQUID FUEL and LPG contactors of pumps and suction pumps
4) Switching ON the 3x400V circuit breaker for feeding pump and suction pump motors

Now the dispenser is ready for fuel dispensing.

## 4.3. Fuel Dispenser Operation

**ATTENTION**

Operator is responsible for normal running of the filling station; the operator shall monitor fuel dispensing and if the customer acts in the non-permitted way, the operator must instruct the customer how to handle the dispenser correctly. The operator shall also mark the risk zone of the filling station by emergency symbols (no smoking, no open fire, driveway direction to the dispenser, etc.). The operating instructions of the filling station and/or the information about elementary duties must be available for the customer.

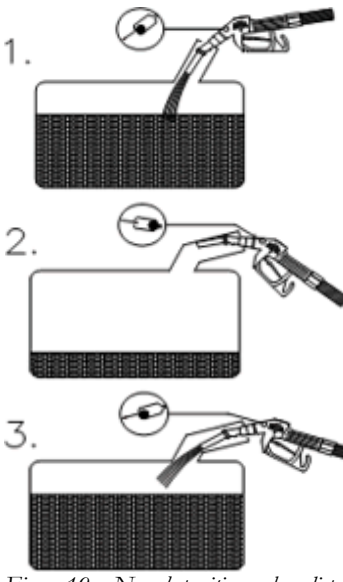
**The LIQUID FUEL fuel dispenser** is activated by taking the nozzle out of the boot, which operation resets electric counter data automatically. Pump electric motor will be started and dispensing can be carried out. Fuel flow rate is controlled by the nozzle. Dispensing is terminated by nozzle locking (release of the control level). The nozzle is then pushed into the nozzle boot, which leads to switching OFF the pump electric motor. The data concerning the dispensed volume remains preserved until the next nozzle release or until the relevant cash amount is paid.

**Before starting of LPG refuelling** the dispenser operator checks if the storage tank has homologation symbol, vehicle engine is OFF and also all electric equipment. The dispenser operator also checks visually the state, eventually possible filler neck wear, which can caused gas-escape. If there are some serious problems, he has the right to refuse refuelling of the tank. In case of gas-escape or danger the operator will terminate refuelling.

### 4.3.1. Fuel Dispensing (LIQUID FUEL)

The liquid measured by the meter is led through the sight glass into the hose and nozzle screwed to the hose. For self-service operation of the filling station the stop-nozzles with the safety lock are used: The flow rate can be controlled by the control lever till its stopping. In the basic version the nozzle is supplied with lever blocking. At the customer's wish the nozzle can be supplied without the blocking, i.e. the lever must be pressed for the whole operation of dispensing. Lever release or falling the stop-nozzle out of the tank hole results in stopped fuel flow. The stop-function is activated in case of the fully filled tank (sensor inlet flooding), the fuel flow is stopped at the pressed control lever. The safety function is activated in case of unprofessional nozzle handling, e.g. if the nozzle is headed by more than 15 degrees from the horizontal plane the fuel flow will be stopped (even if the control lever is pressed). After activated stop-function and safety function the control lever must be released – the lever returns to the initial position.

**Nozzle positions when dispensing**




**Correct nozzle position when dispensing**
The nozzle is in nearly vertical position; the ball does not prevent air passage and the fuel flows out.

**Incorrect nozzle position**
The nozzle is deflected from the horizontal position; the ball prevents air passage and fuel does not flow out.

In case of different versions of fuel tank sockets it is necessary to find optimum nozzle position (when the fuel still flows out). Fuel flow can also be stopped, if the fuel from the nozzle bumps the tank socket wall. In this case the optimum nozzle position must also be found.

*Figure 19 – Nozzle positions when dispensing*

### 4.3.2. LPG Dispensing

Operation of the fuel dispenser itself is provided by the filling station staff that releases the nozzle from the dispenser and connects it with fuel tank of the vehicle, which must be braked reliably. After pressing the control button on the counter box, the electric counter is reset and the pump electric motor placed next to the fuel reservoir started. Refuelling can be stopped at any time by releasing the control button. When filling the "full" tank, the filling tank neck is closed as soon as 80% of the tank volume is refuelled and the safety controller (electric counter) interrupts refuelling after 10 seconds, irrespective of the control button. The data remain displayed on the counter display. The fuel dispensers equipped with electronic pre-selection enable to preset precise requested amount, determined by volume or by price. These dispensers are equipped with the double-stage solenoid valve.

**DUTIES OF LPG FUEL DISPENSER OPERATOR**

- **Keep the operation rules and operation manuals of gas appliances.**
- **Maintain the operated device in safe and workable state.**
- **Notify any failure, defect or unusual phenomena occurred during operation.**
- **Put the device out of operation in case of gas leakage or another danger.**
- **Keep the device in order and clean and prevent unauthorized persons access.**
- **Notify the events, making the operator's work difficult, to the owner.**
- **Record the data concerning start and end of every shift, inspections, repairs and reviews duly into the operating log book.**
- **Operator of the fuel dispenser and fuel tank may not carry out any repairs by himself and change setting of equipment or safety fittings**.

**OPERATOR´S OUTFIT**

- **soap (foamy) solution + brush for detection of leakages**
- **leather gloves**
- **the first aid kit, log book, pen, operating and safety rules, fittings layout and fire extinguisher must be available in the filling station kiosk**

### 4.3.3. Safety at Work with LPG Dispensing Module

Owner of the filling station is responsible for its operation, which shall be entrusted to the trained staff with relevant authorisation only. The operator refuels vehicle pressure tanks by LPG professionally, checks state of the fuel dispenser and other technology in the preset time intervals, checks operation of the whole unit and maintains operation records. The prohibit of smoking and open fire handling in the area of 10 m must be fixed on a visible place next to the fuel dispenser. The notice of necessary motor switch-off, maximum volume of refuelling (80%) and braking the vehicle from undesirable motion has also been placed here.

From the design point of view the fuel dispensers and all components, which might initiate explosion, are approved by the state authorised institution – the State Testing Laboratory No. 210 FTZÚ Ostrava-Radvanice, which issues the necessary certificates. Environmental safety is supported by ČIŽP č. 90/00/895/01/TOM. For detection of possible gas leakages detector sensors can be installed in the dispenser area – the sensors are not part of the basic offer. From the hygienic point of view the device is harmless for the operator and the owner. When operating and maintaining the device, it is suitable to protect the hands by gloves.

**FIRST AID**

**Poisoning - gaseous LPG**

When refuelling, avoid LPG vapour inhalation – danger of suffocation. The injured person must be taken out of the contaminated area. Attention! Fire and explosion hazard! LPG is not poisonous, but it is suffocating. In case of breathing failure carry out artificial breathing immediately; in case of blood circulation failure combine artificial breathing with indirect heart massage. Transport the affected person in the heath facility immediately.

**Frostbites - liquid LPG**

In case of steep fall of overpressure to the atmospheric pressure the liquid LPG is evaporated under the temperature of -42°C. Leakage of the liquid LPG may result in frostbites, when in contact with the skin. Do not rub the frostbitten parts of the body, but cover with a sterile dressing and call the doctor.

In case of eyes affected by LPG flush them by plenty of water and call the doctor.

**Burns - fire**

When burnt, cool the injury by cold water, do not lubricate, cover with a sterile dressing and call the doctor. If the clothes are burnt – do not run, extinguish by water, blanket, by rolling about....

### 4.3.4. Electromechanical Litre Totalizers

The fuel dispensers TATSUNO-BENČ are equipped with electromechanical totalizers as standard for monitoring of the total fuel volume of each hose. The totalizers are installed on the fuel dispenser display. One 7-digit totalizer, displaying the number of full litres pumped by the relevant hose, corresponds to each dispensing nozzle. In case of multi-product dispensers the electromechanical totalizers are arranged on the display from above down and marked by the dispensing hose numbers.

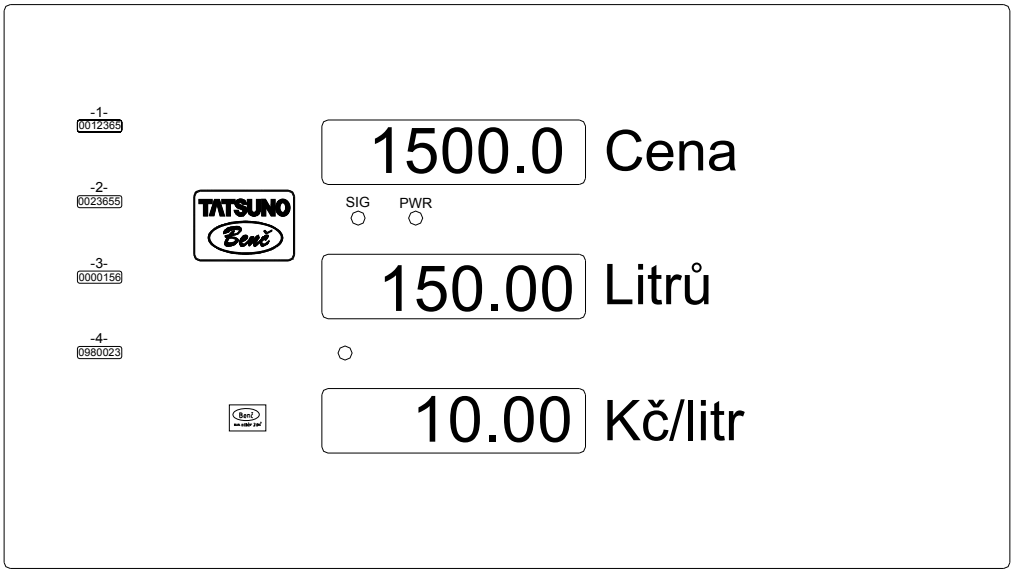



*Figure 20 – Layout of electromechanical totalizers and signalling diodes SIG and PWR on the display*

### 4.3.5. Fuel Dispenser Display Back-lighting

Displays of all fuel dispensers are backlighted by SMD LED diodes. Backlighting intensity of the PDE counter is controlled so that the maximum intensity is during dispensing and it is reduced to one third if the data on the display are not changed (automatically turns off after 30 seconds).

### 4.3.6. Signalling Diode SIG on Display

The signalling diode marked SIG has the following two functions:

- Signalling of vapour exhaust (green)
- Signalling of the state of payment, blocking and failure of the fuel dispenser (red)

The signalling diode **SIG** shines **continuous green** if the function of the system of petrol vapour recovery is correct. The signalling diode **SIG** is switched to **continuous red light**, if the fuel dispenser waits for paying or is in the blocked state and is switched to the **blinking red light** if the fuel dispenser is faulty.

### 4.3.7. Signalling Diode PWR on Display

The orange signalling diode **PWR** serves for signalling of dispenser counter feeding. If the diode is on, the dispenser is actuated.

## 4.3.8. Vapour Recovery

At the customer's request the TATSUNO BENČ dispensers are equipped with the system of petrol vapour recovery, where fuel product vapours (except the diesel fuel) are exhausted from the point of nozzle outlet through the exhauster into the fuel tank.

In case of vapour recovery of the single-product dispenser the exhauster is driven directly by the dispenser pump electric motor.

In case of vapour recovery of the multi-product dispenser each dispenser side has its own exhauster and exhausted vapour flow is controlled according to the fuel flow. Exhausting is switched off if no fuel is dispensed into the tank.

**Activated exhausting** is signalled by the control **SIG** diode installed on the **display panel** (separate for each dispenser side). If vapour exhaustion is set correctly, the signalling LED diode **shines green** whenever the fuel starts to flow out, i.e. the vapours pass through the exhausting piping (the vapour flow meter installed behind the exhauster is active).

*Figure 21 – Connection of the vapour flow sensor*

**Activated vapour exhausting** is controlled by the vapour flow meter installed on the exhausting piping behind the suction pump. When checking this assembly, the dispenser door has to be removed (fig. 21).

**Conditions of filling station operation (Regulation 355/2002 Coll. - Appendix 12)**

All dispensers for petrol dispensing must be provided by a clear sign notifying the customers of the necessity of full nozzle insertion into the filling socket of the vehicle tank.

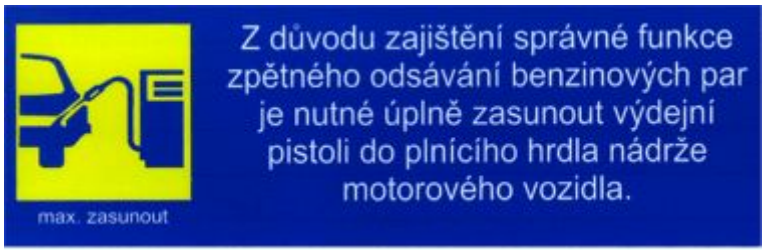



*Figure 22 – Exhaustion - Instructions for customers*

**Conditions of filling station operation (Regulation 355/2002 Coll. - Appendix 12)**

Check of normal operability of the system for vapour recovery of the dispensers shall be done by the filling station operator regularly, once a shift as a minimum. In case of the dispensers equipped with the optic signalling of suction pump operability the operator shall check the pilot light during refuelling.

**ATTENTION**

**If the operator has the reason to believe that the recovery or signalling system is out of order, he shall notify the service organisation immediately; the service organisation shall carry out inspection and repair of the defect.**

### 4.3.9. Fuel Dispenser Operation Modes

There are two basic fuel dispenser operation modes available:
1) manual mode
2) automatic (remote) mode

#### MANUAL MODE

**Manual mode –** the dispenser is operated independently (standalone) without any remote control.

The customer comes to the dispenser and releases nozzle of the product to be dispensed. The displays are reset and the pump motor is switched nearly immediately (within 1 second); the dispenser is ready for dispensing. When dispensed, the customer pushes the nozzle in the boot and pays for the fuel. The dispenser is ready for the next operation of dispensing.

Because the dispenser is not controlled anyhow in the manual mode, the unit fuel price must be set manually on the dispenser.

The number of dispensed litres per shift is determined from the difference of electronic (eventually electromechanical) totalizers at the beginning and at the end of the shift.

#### AUTOMATIC MODE

**Automatic mode** – the dispenser is controlled remotely by the controller (program in PC, control console, etc.)

The automatic mode enables remote control of dispensing – from the filling station kiosk. The control unit placed in the kiosk, enables to the operator to release the dispenser for refuelling and after dispensing collects the information about fuel volume and cash amount.

The customer comes to the dispenser and releases nozzle of the product to be dispensed. The dispenser asks for permission from the control counter in the kiosk; the displays are reset (within 2 seconds after nozzle release) and the pump motor is started. When dispensed, the customer pushes the nozzle into the boot and goes to the kiosk to pay the relevant sum; he receives the tax document (receipt) for the dispensed fuel. The dispenser is

ready immediately for the next operation of dispensing. Because the dispenser is controlled remotely in the automatic mode, the unit fuel price need not be set manually on the dispenser. The correct unit price is set automatically on all fuel dispensers of the filling station by the control counter.

#### SWITCH OVER FROM AUTOMATIC TO MANUAL MODE

The dispensers are connected and set (as a standard) as they should be operated in the filling station; i.e. if the filling station is equipped with the control system, the dispensers will be set to the automatic mode; if the station does not have any control system, the dispensers will be set to the manual mode as a standard.

If the dispensers have to be switched from the automatic to the manual mode – e.g. due to failure of the control system, it is necessary to proceed as follows:

**The dispensers equipped with PDE counter** – change of the value of the parameter P12 has to be done by the remote IR controller – from the value 0 to the value 3; check the unit price setting in the parameter P3 has to be done afterwards.

**ATTENTION**

**Switch over from the automatic to the manual mode shall always be consulted with the serviceman in advance !!!**

### 4.3.10. Preset Keyboard

At the customer request the TATSUNO BENČ dispensers can be equipped with the preset keyboard, enabling fuel volume or cash amount presetting by the customer directly on the dispenser. The customer can decide (before starting of dispensing) what fuel volume to be dispensed or for what cash amount.

The preset value can be cancelled by pressing the key <**Cancel**> before starting of dispensing. Then it is possible to select another value or to be dispensed normally (without any preset).

**NOTE**

If preset keyboards are to be used, then the dispenser must be equipped with preset slow-down valves.

**Example of Presetting in Euro by LIQUID FUEL Dispensing**

1) The customer comes to the dispenser and wishes to refuel himself for CZK 250.
2) The customer enters the value of 25 (presses the key **<EURO 10>** twice and the key **<EURO 1>** five times).
3) The customer selects the hose (product to be dispensed) and releases the nozzle.
4) The fuel dispenser dispenses precisely the preset sum and stops automatically afterwards.
5) The customer pushes the nozzle back into the boot and pays the preset and dispensed fuel volume.

**Example of Presetting in Litres by LIQUID FUEL Dispensing**

1) The customer comes to the dispenser and wishes to refuel himself 20 litres of fuel.
2) The customer enters the value of 20 (presses the key **<10 litres>** twice).
3) The customer selects the hose (product to be dispensed) and releases the nozzle.
4) The fuel dispenser dispenses precisely the preset volume and stops automatically.
5) The customer pushes the nozzle back into the boot and pays the preset and dispensed fuel volume.

**Example of Presetting in Euro by LPG Dispensing**

1) The customer comes to the dispenser and wishes to refuel himself for Euro 25.

2) The dispenser operator releases the nozzle from the fuel dispenser and connects it with the fuel tank of the vehicle. On the preset keyboard the operator enters the value of 25 by numerical keys (presses the key <Euro 10> twice and the key <Euro 1> five times).
3) The operator presses the control button placed on the counter box. Electric counter will be reseted and pump electric motor placed next the storage tank will be switched ON.
4) The fuel dispenser dispenses precisely the preset sum and stops automatically afterwards.

**Example of Presetting in Litres by LPG Dispensing**

1) The customer comes to the dispenser and wishes to refuel 28 litres of.
2) The dispenser operator releases the nozzle from the fuel dispenser and connects it with the fuel tank of the vehicle. On the preset keyboard the operator enters by numerical keys the value of 28 (presses the key <10 litres> twice and the key <1 litre> eight times).
3) The operator presses the control button placed on the counter box. Electric counter will be reseted and pump electric motor placed next the storage tank will be switched ON.
4) The fuel dispenser dispenses precisely the preset volume and stops automatically afterwards.

**Notice:** Refuelling of the preset value can be cancelled by pressing the key <**Cancel**> in time, when the refuelling is not started. Then the other preset value can be entered or to pump in a classical way without preset.

## 4.4. End of Fuel Dispenser Operation

**RECOMMENDATION**

**Switching the fuel dispenser off should be carried out as follows:**

1) **Switch OFF 3x400V circuit breakers of pump and suction pump motor feeding**
2) **Switch OFF 230V circuit breaker for non-stabilized feeding of valves, LIQUID FUEL contactors and LPG pumps and suction pumps**
3) **Switch OFF 230V circuit breaker for stabilized feeding of electronic counter of the dispenser**
4) **Switch OFF the UPS source placed in the kiosk by the switch button on the panel (the green pilot lamp on the UPS source goes off)**

# 5. Maintenance and Service

**CAUTION**

Before starting of any maintenance intervention into mechanical, hydraulic or electric parts, it is always necessary to disconnect the dispenser from the power supply and to protect it from re-connection reliably.

*Figure 23 – Dispenser with removed cover*

*Figure 24 – Distribution box cover*

**CAUTION**

DO NOT REMOVE DISPENSER COVERS ON THE RUNNING UNITS!

**CAUTION**

THE BELT BETWEEN THE MOTOR AND THE PUMP (AND/OR SUCTION PUMP) IS OF ANTISTATIC DESIGN.

CANNOT BE REPLACED FOR ANOTHER TYPE MODEL!

**CAUTION**

DO NOT OPEN THE DISTRIBUTION BOX COVER IF THE DISPENSER IS UNDER VOLTAGE!

**CAUTION**

Each handling and dismantling operation (even LPG filter cap opening) is conditioned by the forcing the medium out of the dispenser hydraulic system by nitrogen or inert gas!

Electric or electronic part interventions may be carried out only by the specialist responsible for safety of the device. After completed service intervention the conductors must be reinstated. Correct conductor installation must prevent any contact with the moving parts of the winding module.

Caution! After each service intervention tightness of hydraulic assemblies has to be inspected; possible medium leakages have to be removed.

## Survey of main principles of dispenser maintenance:

- maintain all dispenser assemblies clean so that possible unforeseen failures can be identified easily and removed quickly
- check all joints systematically, in case of fuel leakage re-tighten the joints and/or re-seal
- check and tighten the V-belt correctly (if need be) by the swinging motor console
- check and tighten the screws (if need be) fixing electric motor to the console
- check condition of the nozzle and decide its repair or replacement, depending on the defect
- check door locks and nozzle accommodation boot for correct function
- maintain the dispenser clean, pay attention particularly to cleanliness of counter glass
- remove sludge, water and other impurities out of the tanks (fuel reservoirs) by the sludge pump
- **lubricate the nozzle by silicone oil twice a week!!!**

## Maintenance of fuel dispenser „body“:

Parts of the dispenser body made of reinforced plastic, lacquered steel or stainless steel need regular maintenance. A great attention shall be paid to these parts particularly in winter season, because aerosols of chloride preparations generated from the salts used for road maintenance can result in permanent damage of lacquers of untreated body parts and/or intercrystalline corrosion in case of the covers made of stainless steel. Regular maintenance of dispenser body is carried out by water and/or by solution of detergents and available car cosmetic preparations.

## Owner of the dispenser is obliged to:

- Appoint one staff member responsible for operation and workability of the dispenser.
- Provide inspections, testing, repairs and maintenance by the professional method.
- File documents and operating records.
- Any and all activities connected with operation and service of the LPG module may be carried out only by the staff with relevant authorisation.

## Principles of the LPG dispenser checking

Check of equipment, tanks, pipe distribution lines and dispenser are carried out with the periodicity, fixed by the operation rules of the filling station in accordance with the valid regulations.

- Check the dispenser hydraulic system for tightness (by soap solution).
- Check of machinery.
- Check of non-return and safety valve for correct function.
- Inspection, calibration and official verification of LPG dispenser is carried out by the Czech Metrology Institute CMI according to valid regulations, abroad relevant institute of the relevant state. Periods for calibration of measuring equipment are determined by the Law No. 505/1990 Coll.
- The inspection is preceded by cleaning of the whole device, clearing the tanks of dust, water and other impurities.

## Dispenser error messages

Defect of the dispenser leads to locking of the refuelling operation and displaying of the error message on the dispenser display. Nearly all error messages may be cleared by the nozzle release and back suspension, by switching the electronic unit feeder ON/OFF, eventually by pressing <**0**> on the remote controller (only the PDE electronic unit).

List of all dispenser error messages is mentioned in the Appendix D.

## 5.2. LPG Dispenser Service

- service operation is carried out in conformity with the operation rules of the filling station
- before staring of the works the dispenser must be put out of operation; the dispenser must be equipped with a visible label "OUT OF ORDER" and the approach lane must be marked by the sign "NO ENTRY"
- the dispenser must be disconnected from the power source (switching OFF the main switch in the main switchboard)
- propane-butane must be forced out of the whole system incl. the dispenser (except for the tank) by nitrogen, before starting any works.
- valves on the supply and return piping must be closed fully
- traffic of the vehicles must be prevented at the distance of 5 m round the dispenser in the during service activities.
- fire extinguisher must be available for the staff
- the service intervention must be carried out by the trained staff of the service company.

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**Service Department**
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**678 01 Blansko**

**HOT-LINE: +420 602 562277**

**FAX: +420 516 428410 E-mail: benc@benc.cz**

## 5.3. Warranty and Complaints

The warranty is established by contract. The manufacturer warrants for the supplied unit for two years or 1 million litres of dispensed medium as a standard (if there is not established by contract otherwise). The warranty does not cover the consumables (e.g. fluorescent tubes). When lodging possible claims, the following data have to be specified:

- Serial number and name - see the rating plate
- Precise description of fault and the circumstances under which the fault occurred.

The claim will not be acknowledged due to damaged seals or non-permitted intervention into the unit. Defects and drawbacks following from incorrect operation, inspection and maintenance of the fuel dispenser or its functional assemblies are out of scope of the warranty (e.g. the problems caused by presence of water and impurities in the tank and the hydraulic system). Check for presence of water and impurities and possible cleaning is necessary during operation.

## 5.4. Accessories

- Installation and User Manual
- Certificate of Quality and Completeness
- Certificate of Conformity
- Pressure Test Report
- Foundation frame (a special order)

**Spare Parts Catalogue**

This document is delivered to the service organisations and service workers.

# 6. Solution of Problems

List of all error messages of the dispenser electronic counter can be found in the Appendix D.

| |
|---|
| **Nozzle release leads to no reaction, no error message appears on the display** |
| It means that the dispenser is not connected to power supply source or nozzles are accommodated on the dispenser badly and/or the fuel dispenser is locked.<br>● First of all try to unlock the dispenser by the remote controller (direct it on the display and press "0").<br>● Then check dispenser feeding (when switched, the display is tested) and nozzle accommodation.<br>● If everything is OK, try to switch the dispenser computer feeding OFF and ON.<br>● If the dispenser is connected to the control computer (console), locking can be connected with the control system, which fails to release the dispenser for normal operation. Disconnect the dispenser from communication with the kiosk (or switch the control counter OFF) and then switch the dispenser OFF and ON. If the dispenser runs in the manual mode, then the control counter is faulty. |
| **After nozzle release the display is reset, but the pump is not started** |
| It means that dispenser electric motor was not started. The reason can be switched OFF electric motor feeding circuit breaker, placed in the main switchboard or disconnected electric motor protection inside the dispenser. Check dispenser three-phase electric motor feeding. |
| **Error message "E18" appears on the dispenser display** |
| It is the error message of the dispenser, which notifies loss of communication between the dispenser and the control counter (console). If the dispenser is controlled by the counter, then check correct function of the computer program, connection of the communication line with the counter or data converter feeding (grey box which the communication line from the dispenser enters into). |
| **The customer releases the nozzle, but cannot dispensing at once(e.g. due to car tank opening). The pump is switched OFF after some time. The message "STOP" appears on the dispenser display.** |
| It is error message of the dispenser which notifies that dispensing was terminated due to break of dispensing for the time period over 60 seconds. Put the nozzle back and repeat dispensing. |
| **Operation of dispensing is interrupted (e.g. replacement of fuel cans). The message "STOP" appears on the dispenser display and the pump is switched OFF.** |
| It is error message of the dispenser which notifies that dispensing was terminated due to break of dispensing (fuel flow) for the time period over 60 seconds. Put the nozzle back and repeat dispensing. |
| **After nozzle release the error message "E30" (PDE) appears on the dispenser display** |
| It is the error message of the fuel dispenser, which notifies zero fuel price.<br>● If the dispenser is operated separately (without being controlled by the counter), then the unit price is set badly. **The price must differ from zero !**<br>● If the dispenser is controlled by the counter, then check setting of unit fuel prices in the counter. During each operation of dispensing the fuel price is sent automatically from the counter to the dispenser. |

*Table 26 – WHAT TO DO IF ...*

## NOTES

# Installation and User Manual
# Appendix A – Technical Parameters

| | |
|---|---|
| Document: | Combined dispensers Liquid Fuel & LPG series SHARK<br>BMP2000.S Installation and User Manual<br>Appendix A – Technical Parameters |
| Reference: | IN022-EN A_TechnicalParameters |
| Revision & Date: | Revision 01, June 10, 2008 |
| Number of pages: | 4 (inclusive of cover) |
| Created by: | Ing. Milan Berka |
| TATSUNO-BENČ EUROPE a.s., Pražská 68, 678 01 Blansko, Czech Republic,<br>tel.+420 516 428411, http://www.benc.cz | |

# a) Liquid Fuel Part of Dispenser

| | | |
|---|---|---|
| Delivered flow rate | standard | 50 L/min |
| | high (/H) | 80 L/min |
| | ultra-high (/UH) | 130 L/min |
| Dispensing accuracy | standard | ± 0,5% at min. delivery 2 litres and minimum flow rate 5 L/min |
| | high (/H) | ± 0,5% at min. delivery 5 litres and minimum flow rate 5 L/min |
| | ultra-high (/UH) | ± 0,5% at min. delivery 10 litres and minimum flow rate 10 L/min |
| Maximum operating pressure | standard | 0,18 MPa (1,8bar) |
| | high (/H), ultra-high (/UH) | 0,25 MPa (2,5bar) |
| Medium types | | petrol, diesel fuel, ethanol (max. E85) |
| Medium viscosity | | 0.3 mPa.s - 17 mPa.s |
| Fuel filtration | output – coarse filter | 200 µm |
| | input - fine filter | 150 µm |
| Suction lift of the liquid column | recommended | 3.5 m (to reach the nominal delivery) |
| | maximum | max. 5.5 m |
| Measuring sensor | TATSUNO EK-1025 internal | two-channel, 2 x $5V_{ss}$, CCW, NPN open collector,<br>2 x 50 pulses per revolution = 100 pulses per 1 litre |
| Pump electric motor | Siemens type 1MA 7083-4 | 3 x 400V; 0,75kW, 1380 rpm, 2.05A, Ia/In = 4.8 |
| | RAEL type ADPE V80 TL4 PR | 3 x 400V; 0,75kW, 1410 rpm, 2.20A, with thermal protection |
| Vapour exhauster electric motor | ATB Flender type ERFY 0.09/3-71 | 3 x 400V; 0,12kW, 2765 rpm, 0.35A, Ia/In = 4.2 |
| | ELNOR type BA240TRII AR-R | 3 x 400V; 0,37kW, 2850 rpm, 1.00A, with thermal protection |
| Pump motor contactors | DIL EM-10 (Moeller Klöckner) | coil 230V; 50Hz (coil 24V; 50Hz for Puma HT-TE, MPD) |
| | - without contactor - | motors RAEL with fixed relay and current protection |
| Solenoid valve | two-stage | 230V; 50Hz; 5W |
| | proportional | 24V DC / 2A |
| Nozzle inside diameter | | DN25, DN32 (/H, /UH) |
| Suction piping flange | | DN32 |

# b) LPG Part of Dispenser

| | | |
|---|---|---|
| Dispensed medium | | liquefied petroleum gas (LPG) |
| Maximum flow rate | Qmax | 50 $dm^3.min^{-1}$ |
| Minimum flow rate | Qmin | 5 $dm^3.min^{-1}$ |
| Min. volume of refuelling | Vmin | 5 $dm^3.min^{-1}$ |
| Cyclic volume | Vc | 0,5 $dm^3$ |
| Operating pressure | p | 1,6 Mpa |
| Max. operating pressure | $p_{max}$ | 1,8 MPa |
| Nominal pressure | $p_N$ | 2,5 MPa |
| Test pressure | $p_z$ | 4,0 Mpa |
| Accuracy of dispensing | | ± 1% |
| Measuring sensor | TATSUNO EK-1025 external | two-channel, 2 x $5V_{ss}$, CCW, NPN open collector,<br>2 x 50 pulses per revolution = 100 pulses per 1 litre |
| Nominal inside diameter of piping | supply piping | DN 19 (liquid phase of LPG) |
| | return piping | DN 16 (gaseous phase of LPG) |
| Solenoid valves | two-stage | 230V; 50Hz; 5W |
| | proportional | +24V DC / 2A |

# c) Common Data of Dispenser

| | | |
|---|---|---|
| Displays | volume | 0000,00 to 9999,99 $dm^3$ |
| | amount | 00000,0 to 99999,9 CZK |
| | unit price | 00,00 to 99,99 CZK/$dm^3$ |
| Switching elements power supply (non-stabilized) | | 230V; 50Hz |
| Counter power supply (stabilized) | | 230V, +10% -15%, 50Hz |
| Counter | | type PDE or PDEX |
| Min. time of information storage (at power failure) | | 15 minutes |
| Data communication | | line RS485, protocol PDE (own) |
| Consumption counter | | as standard 100VA – max. 200VA (max. consumption at 230V) |
| Operating temperature | | -25°C ÷ +55°C |
| Operating air humidity | | 5 ÷ 95 % without condensation |
| Maximum noise level | | 75 dB |
| Mechanical classification | | M2 |
| Electromagnetic classification | | E2 |
| Metrological certification | Liquid Fuel part | EC type certificate No. TCM 141/07 - 4491 |
| | LPG part | EC type certificate No. TCM 141/07 - 4493 |
| ATEX certification | combined dispenser | EC type certificate No. FTZÚ 06 ATEX 0185X |

# Installation and User Manual
# Appendix B – Dispenser Models

| | |
|---|---|
| Document: | Combined dispensers Liquid Fuel & LPG series SHARK<br>BMP2000.S - Installation and User Manual<br>Appendix B – Dispenser Models |
| Reference: | IN022-EN B_TypeTables |
| Revision & Date: | Revision 01, June 10, 2008 |
| Number of pages: | 6 (inclusive of cover) |
| Created by: | Ing. Milan Berka |

TATSUNO-BENČ EUROPE a.s., Pražská 68, 678 01 Blansko, Czech Republic,
tel.+420 516 428411, http://www.benc.cz

## B.1. Dispenser Marking

Combined fuel dispensers of series BMP2000.S are combined of two parts – dispenser for dispensing of liquid fuel Liquid Fuel (petrol, diesel fuel, ethanol mixtures) and module for dispensing of LPG (liquefied propane-butane). Also marking of the dispenser consists of two parts – part marking Liquid Fuel dispenser and part marking LPG module.

Rule of the number of the hydraulic systems and hoses used in the dispenser is kept at the Liquid Fuel dispensers of series BMP2000.S. Two letters (SM or ST) specifying dispenser height variant has been added to the dispenser type. Letters D, L or R describing dispenser orientation on the island has been added to the dispenser type, too.

The base is **BMP20xy.Ssz** , where

x....is the number (1 to 4) giving total number of hydraulic systems (pumps) installed inside dispenser
y.... is the number (1 to 8) giving total number of dispensing nozzles or dispensing hoses
s... is letter M or T, specifying height and design variant of the dispenser:
M - design SHARK MEDIUM with height of 1900mm with hose reels,
T - design SHARK TALL with height of 2300mm,
z.... is one of letters D, R and L giving dispenser orientation on the station island from the car arrival direction
D - double-sided,
R – right-hand,
L – left-hand.

Rule of the number of the LPG hydraulic systems and LPG hoses used in the LPG module is also kept at the LPG module of series BMP2000.S. Two letters (SM or ST) specifying height variant has been added to the module type. Letters D, L or R describing module orientation on the island has been added to the module type, too.

The base is **MOD20xy.Ssz/LPG** , where

x.... is the number (1 to 2) giving total number of independent LPG hydraulic systems (number of LPG inputs) installed in the module
y.... is the number (1 to 2) giving total number of dispensing nozzles or dispensing hoses
s... is letter M or T, specifying height and design variant of the dispenser:
M - design SHARK MEDIUM with height of 1900mm with hosepipe reels,
T - design SHARK TALL with height of 2300mm,
z.... one of letters D, R and L giving dispenser orientation on the station island from the car arrival direction
D - double-sided,
R – right-hand,
L – left-hand.

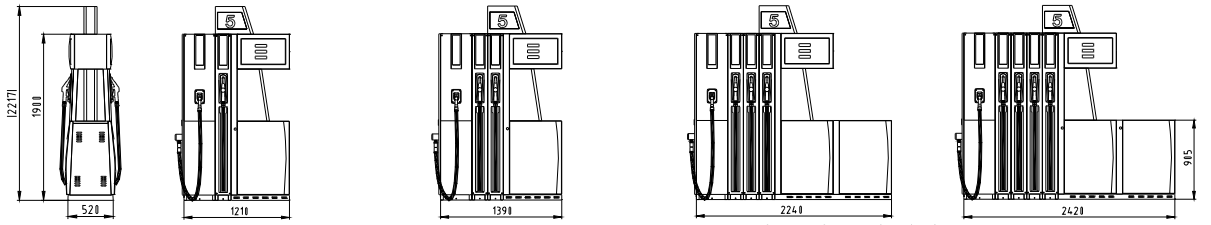
Examples:
**BMP2033.SML+MOD2011.SML/LPG** combined dispenser of series BMP2000.SM Medium, dispenser height 1900 mm, one-sided design – left-hand (dispensing hoses are on the left side in the car arrival direction). The dispenser has 3 Liquid Fuel pumps and 3 dispensing hoses. LPG module has one LPG hydraulic system and one dispensing nozzle.
**BMP2024.SMD+MOD2012.SMD/LPG** combined dispenser of series BMP2000.SM Medium, dispenser height 1900 mm, double-sided design. The dispenser has 2 Liquid Fuel pumps and 4 dispensing hoses (2 + 2 hoses on each side). LPG module has one LPG hydraulic system (one LPG input) and two dispensing nozzles – on each side one.
**BMP2048.STD + MOD2022.STD/LPG** combined dispenser of series BMP2000.ST Tall, dispenser height 2300 mm, double-sided design. The dispenser has 4 Liquid Fuel pumps and 8 dispensing hoses (4 + 4 hosepipes on each side). LPG module has two independent LPG hydraulic systems (two LPG inputs) and two dispensing nozzles - on each side one.

## B.2. List of Abbreviations of Dispenser Type Marking

There is possibility to insert one or several specifying abbreviations mentioned in the table bellow.

| | |
|---|---|
| /D0 | Dispenser for non-public dispense with litre display only |
| /VR or /VR1 | Vapour recovery of one fuel product |
| /VR2, /VR3, /VR4 | Vapour recover of two, three or four fuel products |
| /H or /H1 | Increased pumping output of diesel fuel, of one dispensing hose 70 ÷ 90 l/min |
| /H2 | Increased pumping output of diesel fuel, of two dispensing hoses 70 ÷ 90 l/min |
| /LPG | Type model of LPG dispenser |
| /UH | Ultra-high output of diesel fuel pumping, of one dispensing hose 120 ÷ 150 l/min |
| /MAS | Main dispenser (MASTER) with connection for secondary dispenser (SLAVE) |
| /SAT | Satellite dispenser, which is connected to the dispenser MASTER |
| /ER4 | Dispenser with data communication interface Hectronic (Kienzle) ER4 |
| /LOG | Dispenser with data communication interface Logitron PUMALAN |

# B.3. Series BMP2000.SM "Medium" - variant 1900mm with hose reels and LPG module design "Medium" 1900mm




BMP2012.SMD+MOD2012.SMD/LPG BMP2024.SMD+MOD2012.SMD/LPG BMP2036.SMD+MOD2012.SMD/LPG BMP2048.SMD+MOD2012.SMD/LPG

| Dispenser type | Number of dispensing places | Number of products (pumps) | Number of dispensing hoses | Number of displays | Delivered flow rate [l/min] | Variants |
|---|---|---|---|---|---|---|
| BMP2011.SML + MOD2011.SML/LPG | 1 | 1 x Fuel<br>1 x LPG | 1 x Fuel<br>1 x LPG | 1 | Fuel: 35 ÷ 50<br>LPG: 50 | /D0 /H L/R -2C |
| BMP2012.SMD + MOD2012.SMD/LPG | 2 | 1 x Fuel<br>1 x LPG | 2 x Fuel<br>2 x LPG | 2 | Fuel: 35 ÷ 50<br>LPG: 50 | /D0 /H -4C |
| BMP2022.SML + MOD2011.SML/LPG | 1 | 2 x Fuel<br>1 x LPG | 2 x Fuel<br>1 x LPG | 1 | Fuel: 35 ÷ 50<br>LPG: 50 | /D0 L/R /H -2C |
| BMP2024.SMD + MOD2012.SMD/LPG | 2 | 2 x Fuel<br>1 x LPG | 4 x Fuel<br>2 x LPG | 2 | Fuel: 35 ÷ 50<br>LPG: 50 | /D0 /H -4C |
| BMP2033.SML + MOD2011.SML/LPG | 1 | 3 x Fuel<br>1 x LPG | 3 x Fuel<br>1 x LPG | 1 | Fuel: 35 ÷ 50<br>LPG: 50 | /D0 L/R /H -2C |
| BMP2036.SMD + MOD2012.SMD/LPG | 2 | 3 x Fuel<br>1 x LPG | 6 x Fuel<br>2 x LPG | 2 | Fuel: 35 ÷ 50<br>LPG: 50 | /D0 /H -4C |
| BMP2044.SML + MOD2011.SML/LPG | 1 | 4 x Fuel<br>1 x LPG | 4 x Fuel<br>1 x LPG | 1 | Fuel: 35 ÷ 50<br>LPG: 50 | /D0 L/R /H |
| BMP2048.SMD + MOD2012.SMD/LPG | 2 | 4 x Fuel<br>1 x LPG | 8 x Fuel<br>2 x LPG | 2 | Fuel: 35 ÷ 50<br>LPG: 50 | /D0 /H |

Notes:

/D0 All dispensers in table can be manufactured for non-public dispense with litre (volume) display only. They have no displays for the cash amount and fuel product price.

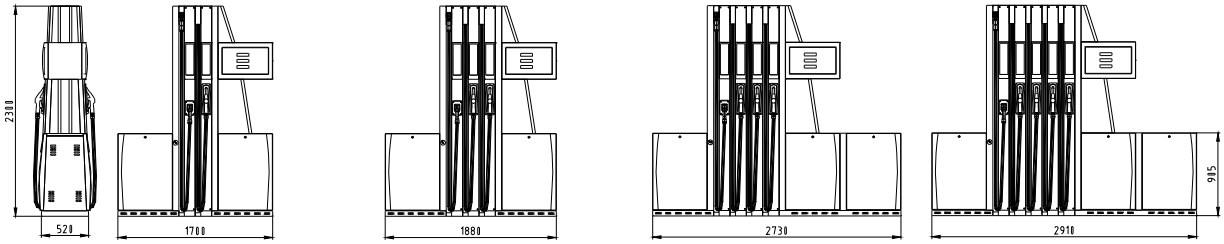
/H The increased output of Liquid Fuel pump (diesel fuel) to output 70 ÷ 90 L/min. is by the dispensers marked in this way.

L/R One-sided dispensers can be in the left-hand design L (.SML), when the display is on the left side of the dispenser from the point of car arrival direction, or in the right-hand design R (.SMR), when the display is on the right side of the dispenser from the point of car arrival direction.

-2C One-sided dispensers marked in this way can refuel one of the Liquid Fuel and LPG products at the same time (2 simultaneous refuels). The dispenser is equipped with the proportional display, where are displayed both Liquid Fuel and LPG refuels at the same time.

-4C Combined dispensers marked in this way can refuel one of the Liquid Fuel and LPG products on each side at the same time. There is possibility to carry out 4 refuels at the same time (2 x Liquid Fuel and 2 x LPG). The dispenser is equipped on the each side with the proportional display, where are displayed both Liquid Fuel and LPG refuels at the same time.

## B.4. Series BMP2000.ST "Tall" - variant 2300mm with free hanging hoses and LPG module design "Tall" 2300mm




BMP2012.STD+MOD2012.STD/LPG
BMP2012.STD+MOD2022.STD/LPG

BMP2024.STD+MOD2012.STD/LPG
BMP2024.STD+MOD2022.STD/LPG

BMP2036.STD+MOD2012.STD/LPG
BMP2036.STD+MOD2022.STD/LPG

BMP2048.STD+MOD2012.STD/LPG
BMP2048.STD+MOD2022.STD/LPG

| Dispenser type | Number of dispensing places | Number of products (pumps) | Number of dispensing hoses | Number of displays | Delivered flow rate [l/min] | Variants |
|---|---|---|---|---|---|---|
| BMP2011.STL + MOD2011.STL/LPG | 1 | 1 x Fuel<br>1 x LPG | 1 x Fuel<br>1 x LPG | 1 | Fuel: 35 ÷ 50<br>LPG: 50 | /D0 /H L/R -2C |
| BMP2012.STD + MOD2012.STD/LPG | 2 | 1 x Fuel<br>1 x LPG | 2 x Fuel<br>2 x LPG | 2 | Fuel: 35 ÷ 50<br>LPG: 50 | /D0 /H -4C |
| BMP2012.STD + MOD2022.STD/LPG | 2 | 1 x Fuel<br>2 x LPG | 2 x Fuel<br>2 x LPG | 2 | Fuel: 35 ÷ 50<br>LPG: 50 | /D0 /H -4C |
| BMP2021.STL/UH + MOD2011.STL/LPG | 1 | 2 x Fuel<br>1 x LPG | 1 x Fuel<br>1 x LPG | 1 | Fuel: 120÷150<br>LPG: 50 | /D0 L/R -2C |
| BMP2022.STL + MOD2011.STL/LPG | 1 | 2 x Fuel<br>1 x LPG | 2 x Fuel<br>1 x LPG | 1 | Fuel: 35 ÷ 50<br>LPG: 50 | /D0 L/R /H -2C |
| BMP2024.STD + MOD2012.STD/LPG | 2 | 2 x Fuel<br>1 x LPG | 4 x Fuel<br>2 x LPG | 2 | Fuel: 35 ÷ 50<br>LPG: 50 | /D0 /H -4C |
| BMP2024.STD + MOD2022.STD/LPG | 2 | 2 x Fuel<br>2 x LPG | 4 x Fuel<br>2 x LPG | 2 | Fuel: 35 ÷ 50<br>LPG: 50 | /D0 /H -4C |
| BMP2033.STL + MOD2011.STL/LPG | 1 | 3 x Fuel<br>1 x LPG | 3 x Fuel<br>1 x LPG | 1 | Fuel: 35 ÷ 50<br>LPG: 50 | /D0 L/R /H -2C |
| BMP2036.STD + MOD2012.STD/LPG | 2 | 3 x Fuel<br>1 x LPG | 6 x Fuel<br>2 x LPG | 2 | Fuel: 35 ÷ 50<br>LPG: 50 | /D0 /H -4C |
| BMP2036.STD + MOD2022.STD/LPG | 2 | 3 x Fuel<br>2 x LPG | 6 x Fuel<br>2 x LPG | 2 | Fuel: 35 ÷ 50<br>LPG: 50 | /D0 /H -4C |
| BMP2042.STD/UH+MOD2012.STD/LPG | 2 | 4 x Fuel<br>1 x LPG | 2 x Fuel<br>2 x LPG | 2 | Fuel: 120÷150<br>LPG: 50 | /D0 L/R -4C |
| BMP2042.STD/UH+MOD2022.STD/LPG | 2 | 4 x Fuel<br>2 x LPG | 2 x Fuel<br>2 x LPG | 2 | Fuel: 120÷150<br>LPG: 50 | /D0 L/R -4C |
| BMP2044.STL + MOD2011.STL/LPG | 1 | 4 x Fuel<br>1 x LPG | 4 x Fuel<br>1 x LPG | 1 | Fuel: 35 ÷ 50<br>LPG: 50 | /D0 L/R /H |
| BMP2048.STD + MOD2012.STD/LPG | 2 | 4 x Fuel<br>1 x LPG | 8 x Fuel<br>2 x LPG | 2 | Fuel: 35 ÷ 50<br>LPG: 50 | /D0 /H |
| BMP2048.STD + MOD2022.STD/LPG | 2 | 4 x Fuel<br>2 x LPG | 8 x Fuel<br>2 x LPG | 2 | Fuel: 35 ÷ 50<br>LPG: 50 | /D0 /H |

Notes:

/D0 All dispensers in table can be manufactured for non-public dispense with litre (volume) display only. They have no displays for the cash amount and fuel product price.

/H The increased output of Liquid Fuel pump (diesel fuel) to output 70 ÷ 90 L/min. is by the dispensers marked in this way.

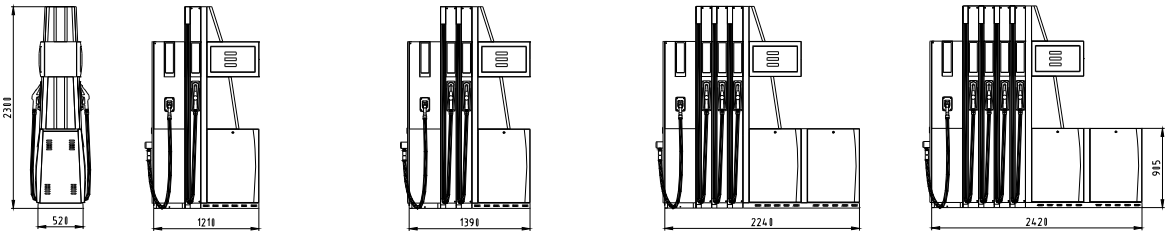
/UH The increased output of Liquid Fuel pump (diesel fuel) to output 120 ÷ 150 L/min. is by the dispensers marked in this way.

L/R One-sided dispensers can be in the left-hand design L (.SML), when the display is on the left side of the dispenser from the point of car arrival direction, or in the right-hand design R (.SMR), when the display is on the right side of the dispenser from the point of car arrival direction.

-2C One-sided dispensers marked in this way can refuel one of the Liquid Fuel and LPG products at the same time (2 simultaneous refuels). The dispenser is equipped with the proportional display, where are displayed both Liquid Fuel and LPG refuels at the same time.

-4C Combined dispensers marked in this way can refuel one of the Liquid Fuel and LPG products on each side at the same time. There is possibility to carry out 4 refuels at the same time (2 x Liquid Fuel and 2 x LPG). The dispenser is equipped on the each side with the proportional display, where are displayed both Liquid Fuel and LPG refuels at the same time.

## B.5. Series BMP2000.ST "Tall" - variant 2300mm with free hanging hoses and LPG module design "Medium" 1900mm




BMP2012.STD+MOD2012.SMD/LPG BMP2024.STD+MOD2012.SMD/LPG BMP2036.STD+MOD2012.SMD/LPG BMP2048.STD+MOD2012.SMD/LPG

| Dispenser type | Number of dispensing places | Number of products (pumps) | Number of dispensing hoses | Number of displays | Delivered flow rate [l/min] | Variants |
|---|---|---|---|---|---|---|
| BMP2011.STL + MOD2011.SML/LPG | 1 | 1 x Fuel<br>1 x LPG | 1 x Fuel<br>1 x LPG | 1 | Fuel: 35 ÷ 50<br>LPG: 50 | /D0 /H L/R -2C |
| BMP2012.STD + MOD2012.SMD/LPG | 2 | 1 x Fuel<br>1 x LPG | 2 x Fuel<br>2 x LPG | 2 | Fuel: 35 ÷ 50<br>LPG: 50 | /D0 /H -4C |
| BMP2021.STL/UH+ MOD2011.SML/LPG | 1 | 2 x Fuel<br>1 x LPG | 1 x Fuel<br>1 x LPG | 1 | Fuel: 120÷150<br>LPG: 50 | /D0 L/R -2C |
| BMP2022.STL + MOD2011.SML/LPG | 1 | 2 x Fuel<br>1 x LPG | 2 x Fuel<br>1 x LPG | 1 | Fuel: 35 ÷ 50<br>LPG: 50 | /D0 L/R /H -2C |
| BMP2024.STD + MOD2012.SMD/LPG | 2 | 2 x Fuel<br>1 x LPG | 4 x Fuel<br>2 x LPG | 2 | Fuel: 35 ÷ 50<br>LPG: 50 | /D0 /H -4C |
| BMP2033.STL + MOD2011.SML/LPG | 1 | 3 x Fuel<br>1 x LPG | 3 x Fuel<br>1 x LPG | 1 | Fuel: 35 ÷ 50<br>LPG: 50 | /D0 L/R /H -2C |
| BMP2036.STD + MOD2012.SMD/LPG | 2 | 3 x Fuel<br>1 x LPG | 6 x Fuel<br>2 x LPG | 2 | Fuel: 35 ÷ 50<br>LPG: 50 | /D0 /H -4C |
| BMP2042.STD/UH+MOD2012.SMD/LPG | 2 | 4 x Fuel<br>1 x LPG | 2 x Fuel<br>2 x LPG | 2 | Fuel: 120÷150<br>LPG: 50 | /D0 L/R -4C |
| BMP2044.STL + MOD2011.SML/LPG | 1 | 4 x Fuel<br>1 x LPG | 4 x Fuel<br>1 x LPG | 1 | Fuel: 35 ÷ 50<br>LPG: 50 | /D0 L/R /H |
| BMP2048.STD + MOD2012.SMD/LPG | 2 | 4 x Fuel<br>1 x LPG | 8 x Fuel<br>2 x LPG | 2 | Fuel: 35 ÷ 50<br>LPG: 50 | /D0 /H |

Notes:

/D0 All dispensers in table can be manufactured for non-public dispense with litre (volume) display only. They have no displays for the cash amount and fuel product price.

/H The increased output of Liquid Fuel pump (diesel fuel) to output 70 ÷ 90 L/min. is by the dispensers marked in this way.

/UH The increased output of Liquid Fuel pump (diesel fuel) to output 120 ÷ 150 L/min. is by the dispensers marked in this way.

L/R One-sided dispensers can be in the left-hand design L (.SML), when the display is on the left side of the dispenser from the point of car arrival direction, or in the right-hand design R (.SMR), when the display is on the right side of the dispenser from the point of car arrival direction.

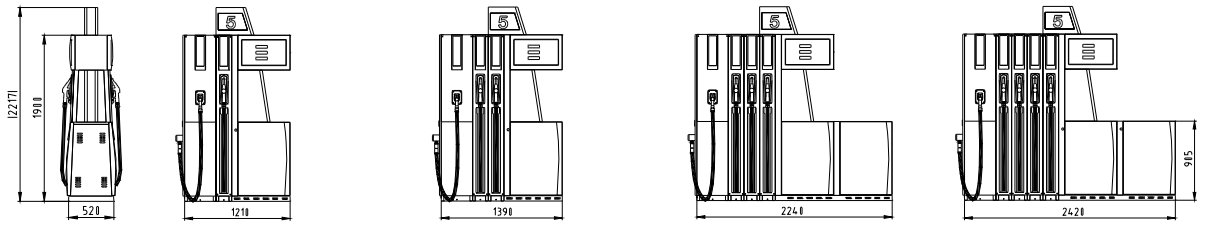
-2C One-sided dispensers marked in this way can refuel one of the Liquid Fuel and LPG products at the same time (2 simultaneous refuels). The dispenser is equipped with the proportional display, where are displayed both Liquid Fuel and LPG refuels at the same time.

-4C Combined dispensers marked in this way can refuel one of the Liquid Fuel and LPG products on each side at the same time. There is possibility to carry out 4 refuels at the same time (2 x Liquid Fuel and 2 x LPG). The dispenser is equipped on the each side with the proportional display, where are displayed both Liquid Fuel and LPG refuels at the same time.

# Installation and User Manual
# Appendix C – Dimensions and Weight

| | |
|---|---|
| Document: | Combined dispensers Liquid Fuel & LPG series SHARK<br>BMP2000.S - Installation and User Manual<br>Appendix C – Dimensions and Weight |
| Reference: | IN022-EN C_DimensionsWeights |
| Revision & Date: | Revision 01, June 10, 2008 |
| Number of pages: | 5 (inclusive of cover) |
| Created by: | Ing. Milan Berka |
| TATSUNO-BENČ EUROPE a.s., Pražská 68, 678 01 Blansko, Czech Republic,<br>tel.+420 516 428411, http://www.benc.cz | |

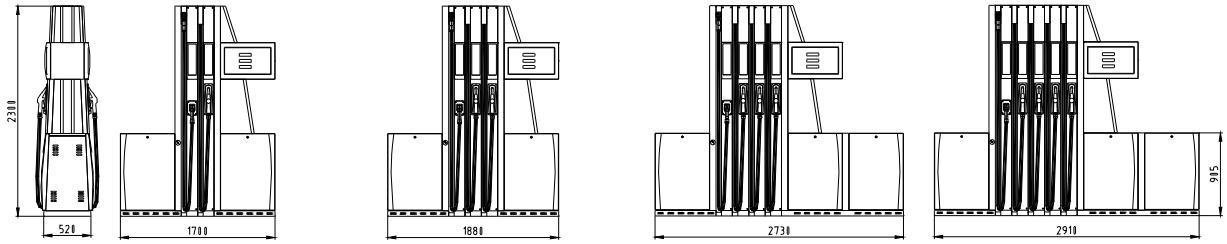
## C.1. Series BMP2000.SM "Medium" - variant 1900mm with hose reels and LPG module - design "Medium" 1900mm




BMP2012.SMD+MOD2012.SMD/LPG BMP2024.SMD+MOD2012.SMD/LPG BMP2036.SMD+MOD2012.SMD/LPG BMP2048.SMD+MOD2012.SMD/LPG

| Dispenser type | Height [mm] | Width [mm] | Length [mm] | Weight [kg] |
|---|---|---|---|---|
| BMP2011.SML + MOD2011.SML/LPG | 2217 (1900) | 520 | 1210 | 315 |
| BMP2012.SMD + MOD2012.SMD/LPG | 2217 (1900) | 520 | 1210 | 340 |
| BMP2022.SML + MOD2011.SML/LPG | 2217 (1900) | 520 | 1390 | 425 |
| BMP2024.SMD + MOD2012.SMD/LPG | 2217 (1900) | 520 | 1390 | 495 |
| BMP2033.SML + MOD2011.SML/LPG | 2217 (1900) | 520 | 2240 | 580 |
| BMP2036.SMD + MOD2012.SMD/LPG | 2217 (1900) | 520 | 2240 | 685 |
| BMP2044.SML + MOD2011.SML/LPG | 2217 (1900) | 520 | 2420 | 700 |
| BMP2048.SMD + MOD2012.SMD/LPG | 2217 (1900) | 520 | 2420 | 840 |

## C.2. Series BMP2000.ST "Tall" - variant 2300mm with free hanging hoses and LPG module - design "Tall" 2300mm




BMP2012.STD+MOD2012.STD/LPG
BMP2012.STD+MOD2022.STD/LPG

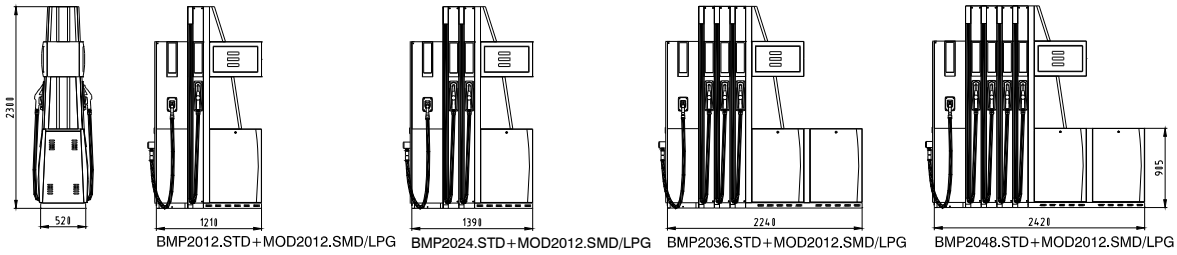
BMP2024.STD+MOD2012.STD/LPG
BMP2024.STD+MOD2022.STD/LPG

BMP2036.STD+MOD2012.STD/LPG
BMP2036.STD+MOD2022.STD/LPG

BMP2048.STD+MOD2012.STD/LPG
BMP2048.STD+MOD2022.STD/LPG

| Dispenser type | Height [mm] | Width [mm] | Length [mm] | Weight [kg] |
|---|---|---|---|---|
| BMP2011.STL + MOD2011.STL/LPG | 2300 | 520 | 1700 | 320 |
| BMP2012.STD + MOD2012.STD/LPG | 2300 | 520 | 1700 | 350 |
| BMP2012.STD + MOD2022.STD/LPG | 2300 | 520 | 1700 | 360 |
| BMP2021.STL/UH + MOD2011.STL/LPG | 2300 | 520 | 1700 | 360 |
| BMP2022.STL + MOD2011.STL/LPG | 2300 | 520 | 1880 | 375 |
| BMP2024.STD + MOD2012.STD/LPG | 2300 | 520 | 1880 | 440 |
| BMP2024.STD + MOD2022.STD/LPG | 2300 | 520 | 1880 | 450 |
| BMP2033.STL + MOD2011.STL/LPG | 2300 | 520 | 2730 | 520 |
| BMP2036.STD + MOD2012.STD/LPG | 2300 | 520 | 2730 | 610 |
| BMP2036.STD + MOD2022.STD/LPG | 2300 | 520 | 2730 | 620 |
| BMP2042.STD/UH+MOD2012.STD/LPG | 2300 | 520 | 2550 | 660 |
| BMP2042.STD/UH+MOD2022.STD/LPG | 2300 | 520 | 2550 | 670 |
| BMP2044.STL + MOD2011.STL/LPG | 2300 | 520 | 2910 | 580 |
| BMP2048.STD + MOD2012.STD/LPG | 2300 | 520 | 2910 | 700 |
| BMP2048.STD + MOD2022.STD/LPG | 2300 | 520 | 2910 | 710 |

## C.3. Series BMP2000.ST "Tall" - variant 2300mm with free hanging hoses and LPG module - design "Medium" 1900mm




BMP2012.STD+MOD2012.SMD/LPG BMP2024.STD+MOD2012.SMD/LPG BMP2036.STD+MOD2012.SMD/LPG BMP2048.STD+MOD2012.SMD/LPG

| Dispenser type | Height [mm] | Width [mm] | Length [mm] | Weight [kg] |
|---|---|---|---|---|
| BMP2011.STL + MOD2011.SML/LPG | 2300 | 520 | 1210 | 320 |
| BMP2012.STD + MOD2012.SMD/LPG | 2300 | 520 | 1210 | 350 |
| BMP2021.STL/UH + MOD2011.SML/LPG | 2300 | 520 | 1210 | 360 |
| BMP2022.STL + MOD2011.SML/LPG | 2300 | 520 | 1390 | 375 |
| BMP2024.STD + MOD2012.SMD/LPG | 2300 | 520 | 1390 | 440 |
| BMP2033.STL + MOD2011.SML/LPG | 2300 | 520 | 2240 | 520 |
| BMP2036.STD + MOD2012.SMD/LPG | 2300 | 520 | 2240 | 610 |
| BMP2042.STD/UH+MOD2012.SMD/LPG | 2300 | 520 | 2060 | 660 |
| BMP2044.STL + MOD2011.SML/LPG | 2300 | 520 | 2420 | 580 |
| BMP2048.STD + MOD2012.SMD/LPG | 2300 | 520 | 2420 | 700 |

# Installation and User Manual
# Appendix D – Error Messages

| | |
|---|---|
| Document: | Combined dispensers Liquid Fuel & LPG series SHARK<br>BMP2000.S - Installation and User Manual<br>Appendix D – Error Messages |
| Reference: | IN022-EN D_ErrorMessages |
| Revision & Datum: | Revision 01, June 10, 2008 |
| Number of pages: | 5 (inclusive of cover) |
| Produced by: | Ing. Milan Berka |
| TATSUNO-BENČ EUROPE a.s., Pražská 68, 678 01 Blansko, Czech Republic,<br>tel.+420 516 428411, http://www.benc.cz | |

# D.1. Dispenser Error Messages

Combined dispensers of series SHARK BMP2000.S are equipped with electric counter PDE or PDEX type as standard. Electronic counter controls all processes of the dispenser and interrupts dispensing at each failure and error message in form "Exx" (where xx is code of error message) is shown on the dispenser display. Error messages can be divided in some groups according to their seriousness:

- operational message (LOCK)
- warnings (ALERT)
- failures (NFATAL)
- serious failures (FATAL)

Error messages can be cleared by the nozzle release and back its suspension or by the using of remote controller (pointing to the display and pressing key “0”); new refuelling can be started again. When this failure is more serious (FATAL type) it is necessary to switch OFF and ON electric counter feeding of the dispenser.
All error messages (exception of operational messages) are stored in electronic memory automatically from where they can be recalled by P06 (Error History) and P13 (Error Statistics). If the error messages are displayed more frequently it is necessary to inform the service organisation.

Table of error messages:

| Message code | Message type | Cause of error message | Clearing of error message |
|---|---|---|---|
| OFF | LOCK | Complete failure of power supply voltage (failure longer than ca 3-5 period, t > 100 ms) | It is necessary to switch OFF the dispenser counter feeding for ca 10 seconds and then switch ON again. |
| STOP | LOCK | a) Maximum time for refuel interruption is exceeded (see parameter75)<br>b) Preset lower volume value than value preset in parameter P39 – hose expansion | After nozzle accommodation message is cleared. Check the preset of parameter P75 (0 = unlimited refuel), parameter P39 and setting of pre-selection. |
| P x | LOCK | Signal of pump motor blocking (x =1, 2, 3, 4) | Check input conditions for blocking BL1, BL2, BL3 and BL4. After nozzle accommodation message is cleared. |
| E 1 | NFAT | LCD display segment failure or failure of electromechanical display coil | Change of display |
| E 2 | FATAL | Actual number of displays and preset number in parameter No.31 are different | It is necessary to set number of displays according to the reality (P31=1 one display, P31=2 two displays Master & Slave, P31=3 two displays Master & Master for PDEDDCU display) |
| E 3 | NFAT | Failure of exhausted vapour flow sensor of side A | Check the vapour exhaust sensor on side A, eventually parameter setting P81 (0 = without sensor, 6 = with sensor) |
| E 4 | NFAT | Failure of exhausted vapour flow sensor of side B | Check the vapour exhaust sensor on side B, eventually parameter setting P81 (0 = without sensor, 6 = with sensor) |
| E 5 | ALERT | Communication failure with display and electromechanical totalizer | Check the display and electromechanical totalizer connection and their functionality |
| E 6 | NFAT | Electromechanical totalizer failure | Totalizer is not connected, or it does not answer. Check parameter value P74 (0 = not connected, 1 = connected) |
| E 10 | NFAT | Failure of connected temperature sensor | Check the temperature sensor connection Pt100 and parameter value P47 (P47=0 – without correction, 47=1,2 – thermal correction) |

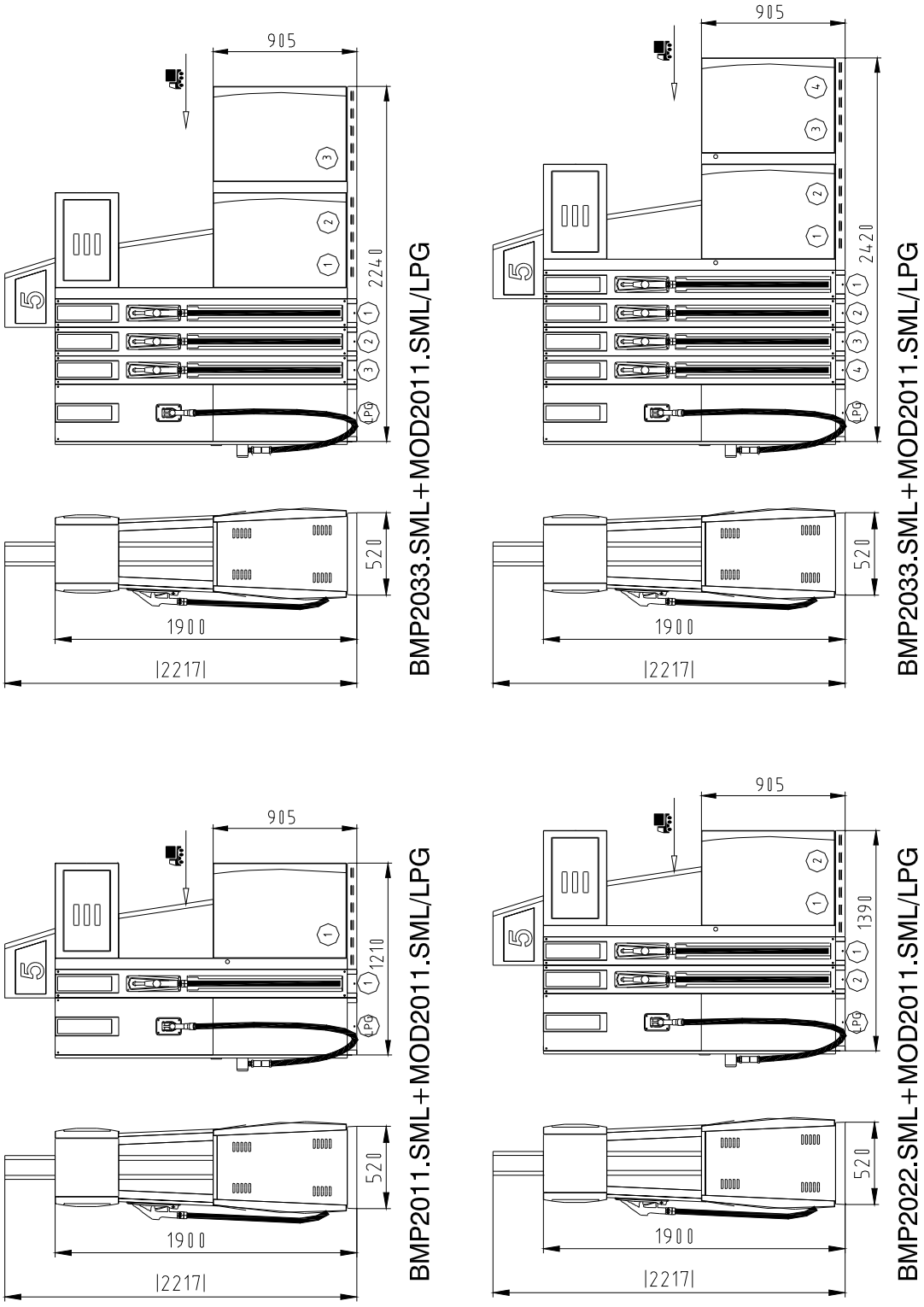
| Message code | Message type | Cause of error message | Clearing of error message |
|---|---|---|---|
| E 11 | NFAT | Invalid value of fuel density | Check the value of P48 parameter for relevant product.<br>PHM: 700 ≤ density ≤ 1200 and parameter P47=1<br>LPG: 500 ≤ density ≤ 600 and parameter P47=2 |
| E12 | FATAL | Error of temperature correction device (PDEINP). Device is not connected or has incorrect check total CRC | Check the value of P47 parameter, eventually carry out change of PDEINP unit |
| E13 | FATAL | Error of metrology or program check total CRC | Program counter or carry out change of panel PDECPU or PDEDUO |
| E16 | ALERT | Communication error between counter and credit unit PDECRE | Check the interconnection of PDECPU x PDECRE, check the functionability of credit module PDECRE. |
| E17 | NFAT | Failure of series communication line, failure of communication, faulty communication data | Check if two dispensers do not have the same address. Check mechanical connection of data line. Check function and setting of data converter. Check communication process by monitor. |
| E18 | ALERT | Failure of series communication line, loss of communication with control computer | Control computer is not connected, communication cable is not connected correctly. Check setting of parameter P76. Check function of data converter. |
| E20 | NFAT | Last refuelling was interrupted non-standardly from reason of power failure during refuelling, or by processor reset owing to disturbance | Check the dispenser feeding and disturbance effects (feeding) |
| E22 | FATAL | Faulty data in memory RAM and EEPROM - invalid CRC | Check parameter setting. Usual situation after new program version loading or all parameters initialisation by parameter P99 = 9999 |
| E25 | FATAL | Electronic totalizers are faulty.<br>Check total (CRC) of totalizers is faulty | Dispenser is locked. Switch OFF and ON dispenser. Check totalizers, eventually carry out totalizers initialisation P99 = 6666 |
| E26 | ALERT | Key TOTAL STOP has been pressed | Message disappears by key unblocking. |
| E27 | FATAL | Dispenser blocking by the manufacturer | Set parameter 79 to value 0, or enter authorisation code into parameter 16 |
| E29 | NFAT | Invalid password was entered at manager mode entry | Enter valid manager password |
| E30 | LOCK | Product unit price equals zero | Set product unit price in cash desk or in parameter P3. |
| E31 | NFAT | Channel error of pulser No.1 (1A) | Check connection of pulser channel and value of parameter No.45<br>Pulsers Tatsuno:<br>2-green (channel A),<br>3-white (channel B)<br>Pulsers Hectronic or Logitron:<br>2-green (channel A)<br>3-white (channel B)<br>Pulsers Eltomatic:<br>2-white (channel A),<br>3-yellow (channel B) |
| E32 | NFAT | Channel error of pulser No. 2 (2A) | |
| E33 | NFAT | Channel error of pulser No.3 (3A) | |
| E34 | NFAT | Channel error of pulser No.4 (4A) | |
| E35 | NFAT | Channel error of pulser No.5 (1B / 5A) | |
| E36 | NFAT | Channel error of pulser No.6 (2B / 6A) | |
| E37 | NFAT | Channel error of pulser No.7 (3B / 7A) | |

| Message code | Message type | Cause of error message | Clearing of error message |
|---|---|---|---|
| E38 | NFAT | Channel error of pulser No.8 (4B) | |
| E41 | NFAT | Connection or pulser No.1 feeding error (1A) | Check pulser connection and value of parameter č.45<br>Pulsers Tatsuno:<br>1-red (5V), 4-yellow (CHCK), 5-black (0V)<br>Pulsers Hectronic:<br>1-yellow (5V), 4-brown (CHCK), 5-brown (0V) - interconnection 4-5<br>Pulsers Eltomatic:<br>1-green (5V), 4-brown (CHCK) 5-brown (0V) - interconnection 4-5 |
| E42 | NFAT | Connection or pulser No.2 feeding error (2A) | |
| E43 | NFAT | Connection or pulser No.3 feeding error (3A) | |
| E44 | NFAT | Connection or pulser No.4 feeding error (4A) | |
| E45 | NFAT | Connection or pulser No.5 feeding error (1B / 5A) | |
| E46 | NFAT | Connection or pulser No.6 feeding error (2B / 6A) | |
| E47 | NFAT | Connection or pulser No.7 feeding error (3B / 7A) | |
| E48 | NFAT | Connection or pulser No.8 feeding error (4B ) | |

# Installation and User Manual
# Appendix E – Figures of Dispensers

| | |
|---|---|
| Document: | Combined dispensers Liquid Fuel & LPG series SHARK<br>BMP2000.S - Installation and User Manual<br>Appendix E – Figures of Dispensers |
| Reference: | IN022-EN E_Pictures |
| Revision & Date: | Revision 01, June 10, 2008 |
| Number of pages: | 12 (inclusive of cover) |
| Created by: | Ing. Milan Berka |
| TATSUNO-BENČ EUROPE a.s., Pražská 68, 678 01 Blansko, Czech Republic,<br>tel.+420 516 428411, http://www.benc.cz | |

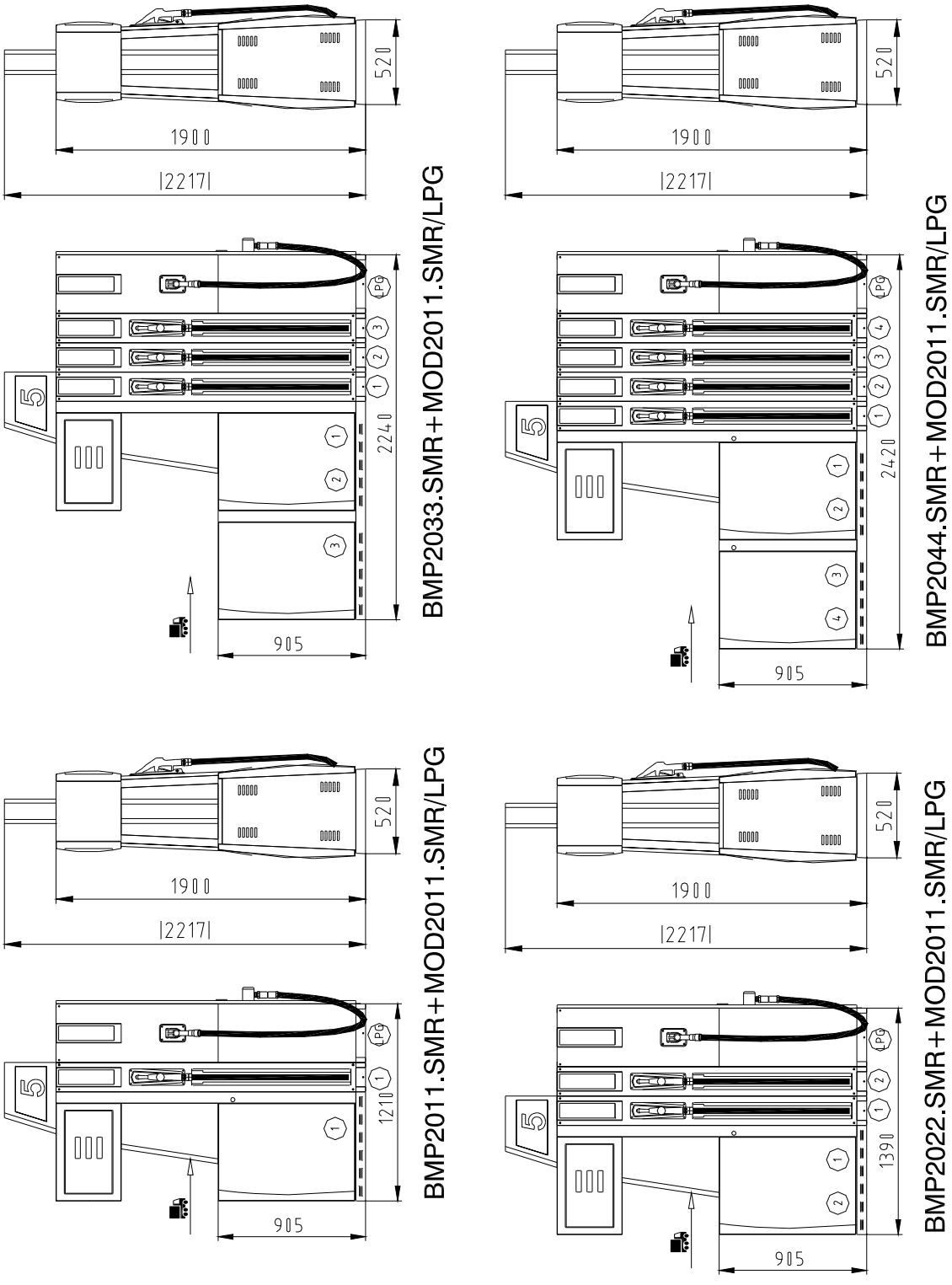
## E.1. Dispensers of Series BMP2000.SM "Medium" with LPG Module "Medium" - one-sided design of the dispenser – left-sided




| Pos. | Description | Pos. | Description |
|---|---|---|---|
| ⇦ | Recommended car arrival direction to the dispenser | ①② ③④ | Fuel products order |

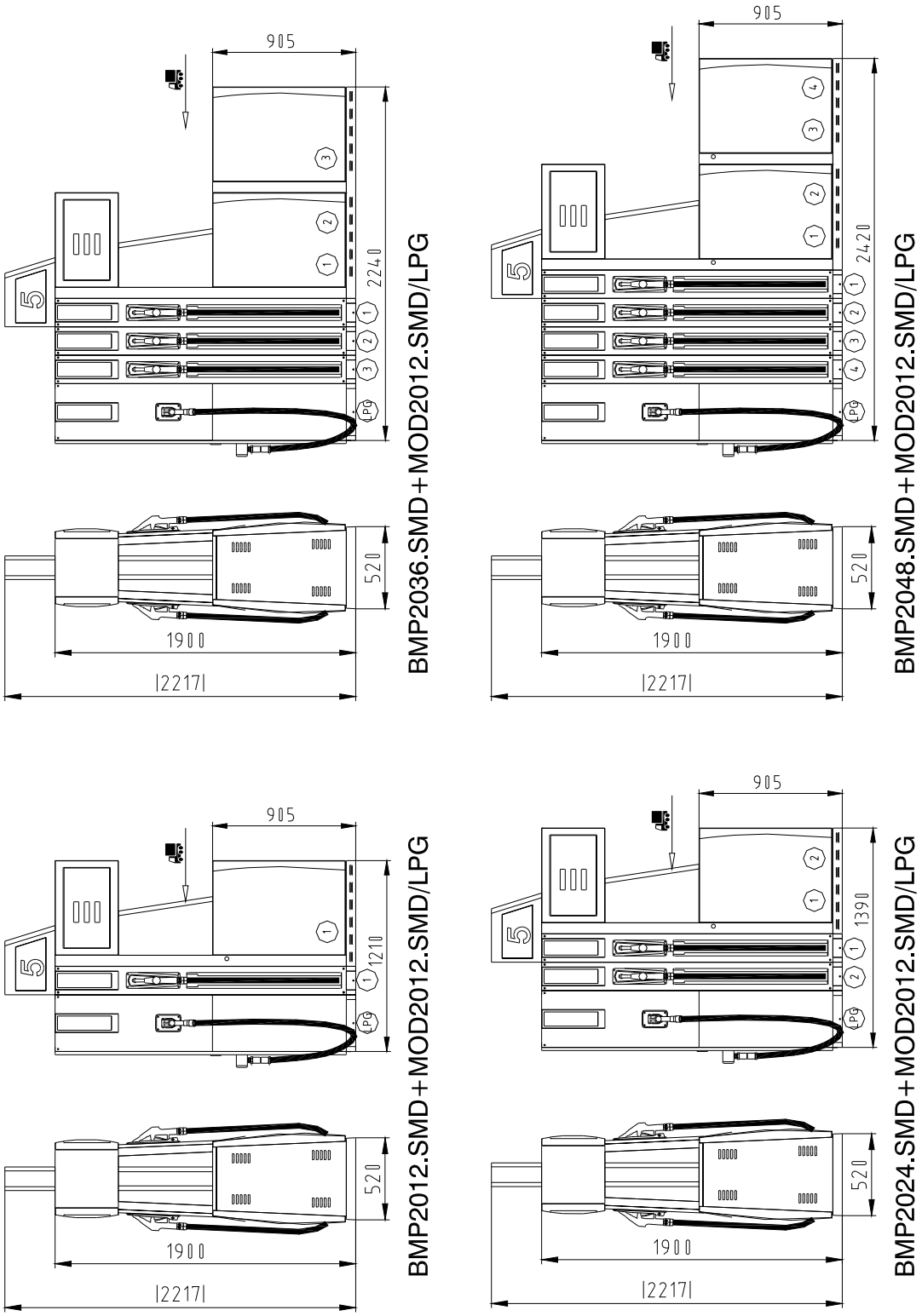
## E.2. Dispensers of Series BMP2000.SM "Medium" with LPG Module

### "Medium" - one-sided design of the dispenser – right-sided



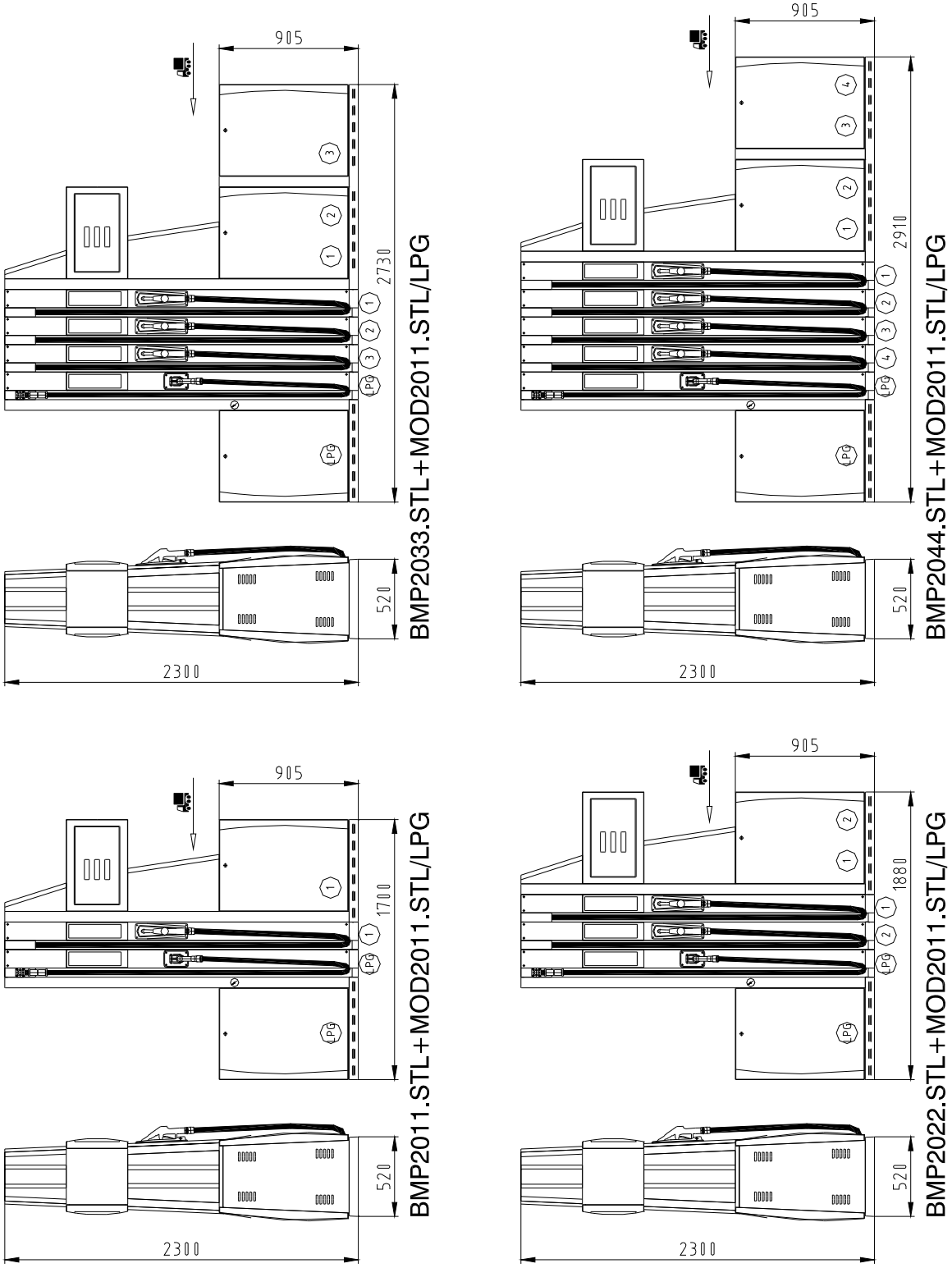

| Pos. | Description | Pos. | Description |
|---|---|---|---|
| ⇦ | Recommended car arrival direction to the dispenser | ①② ③④ | Fuel products order |

## E.3. Dispensers of Series BMP2000.SM "Medium" with LPG Module "Medium" - double-sided design of the dispenser



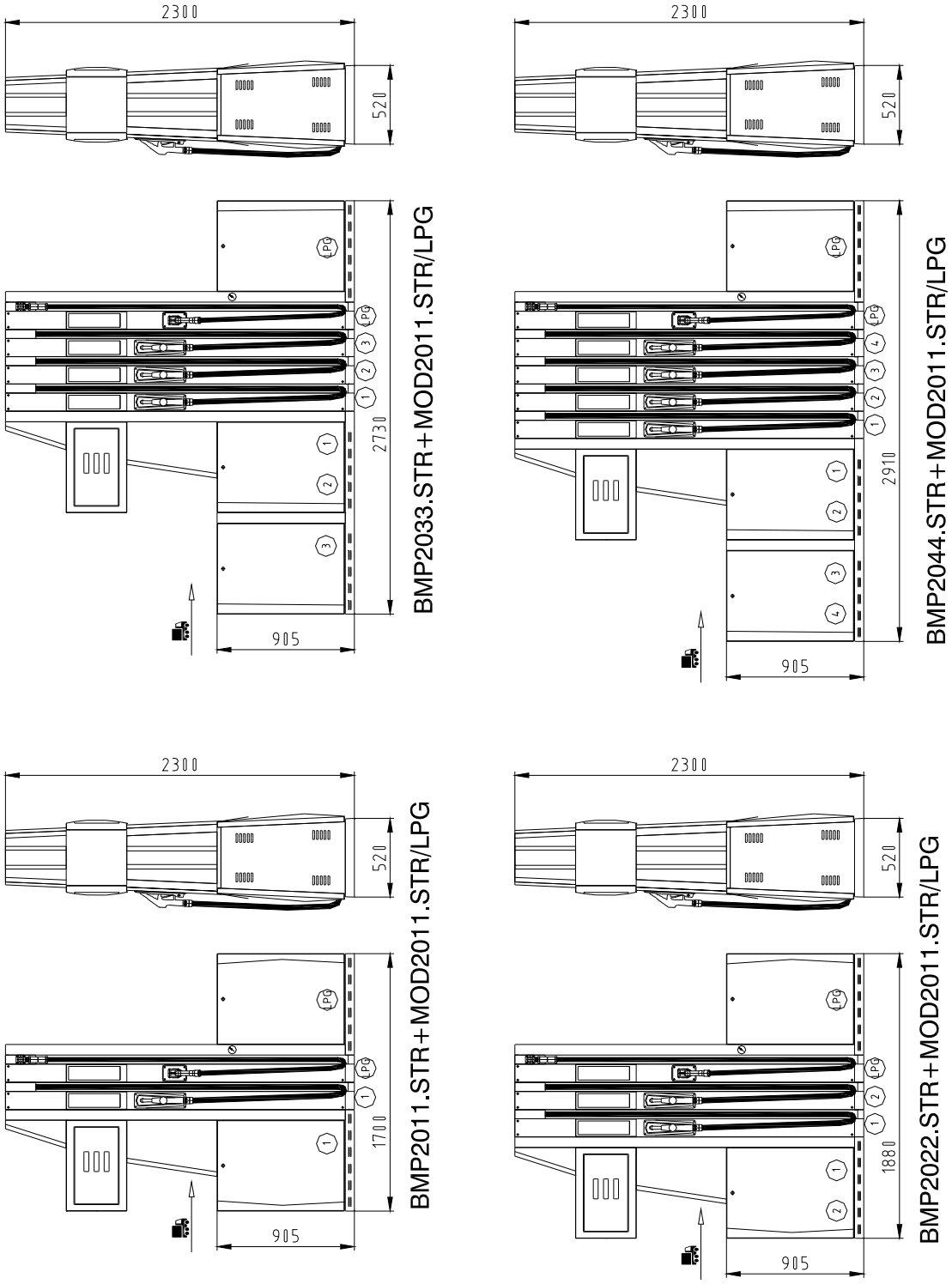

| Pos. | Description | Pos. | Description |
|---|---|---|---|
| ⇦ | Recommended car arrival direction to the dispenser | ①② ③④ | Fuel products order |

# E.4. Dispensers of Series BMP2000.ST "Tall" with LPG Module "Tall" - one-sided design of the dispenser – left-sided



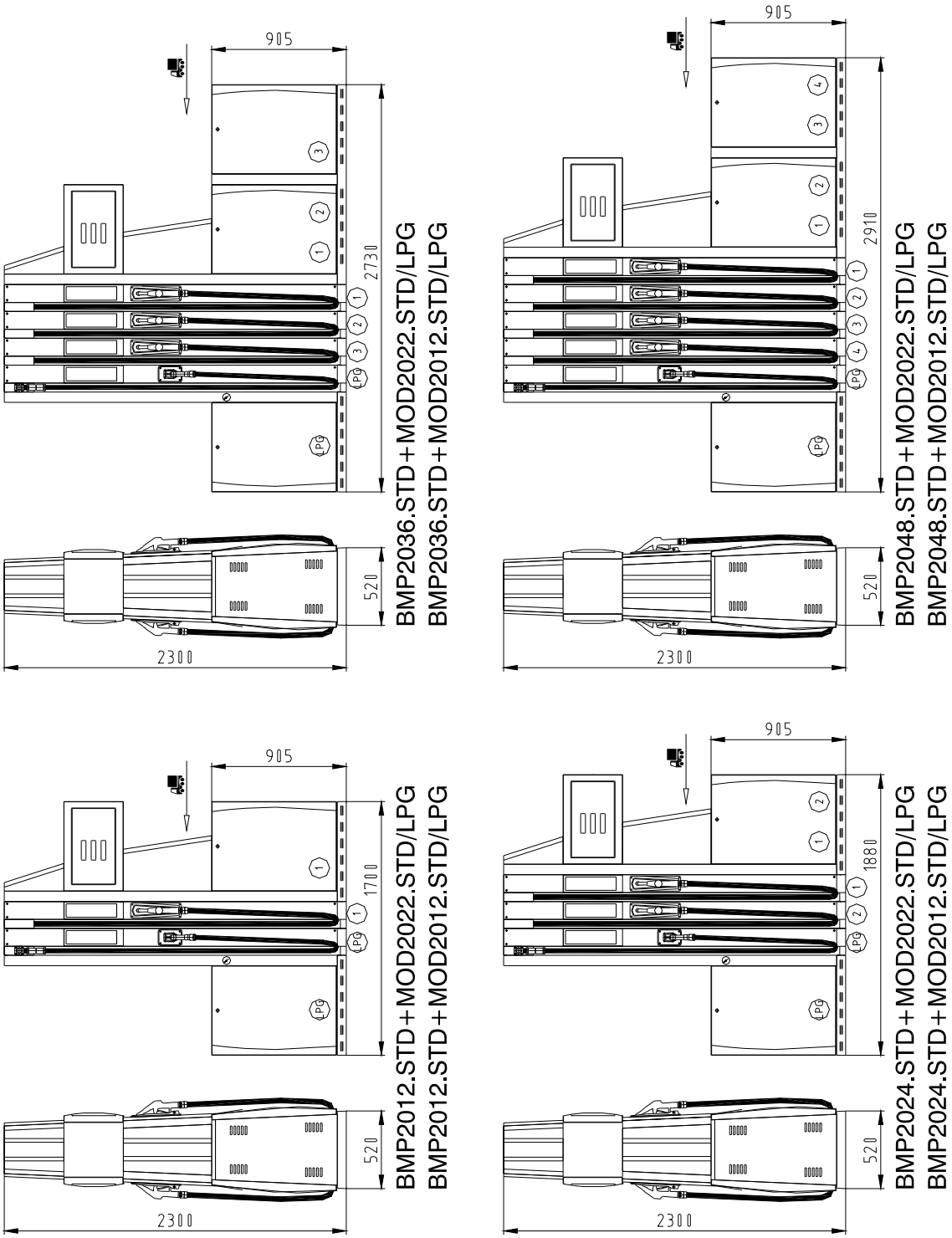

| Pos. | Description | Pos. | Description |
|---|---|---|---|
| ⇦ | Recommended car arrival direction to the dispenser | ①② ③④ | Fuel products order |

## E.5. Dispensers of Series BMP2000.ST "Tall" with LPG Module "Tall" - one-sided design of the dispenser – right-sided



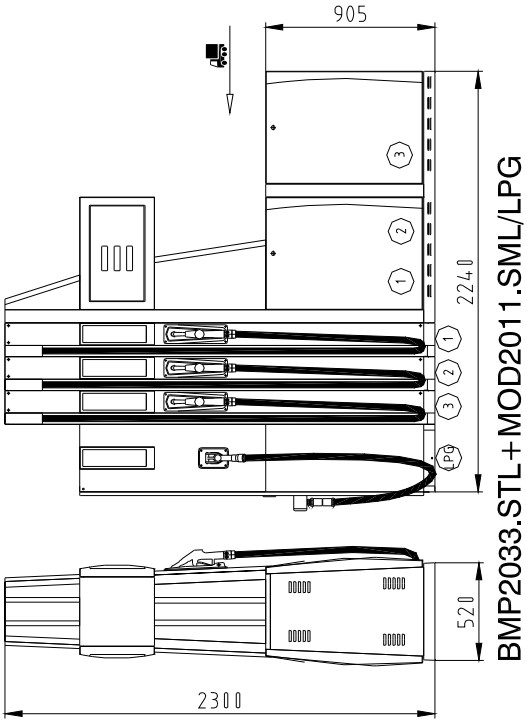

| Pos. | Description | Pos. | Description |
|---|---|---|---|
| ⇦ | Recommended car arrival direction to the dispenser | ①② ③④ | Fuel products order |

# E.6. Dispensers of Series BMP2000.ST "Tall" with LPG Module "Tall" - double-sided design

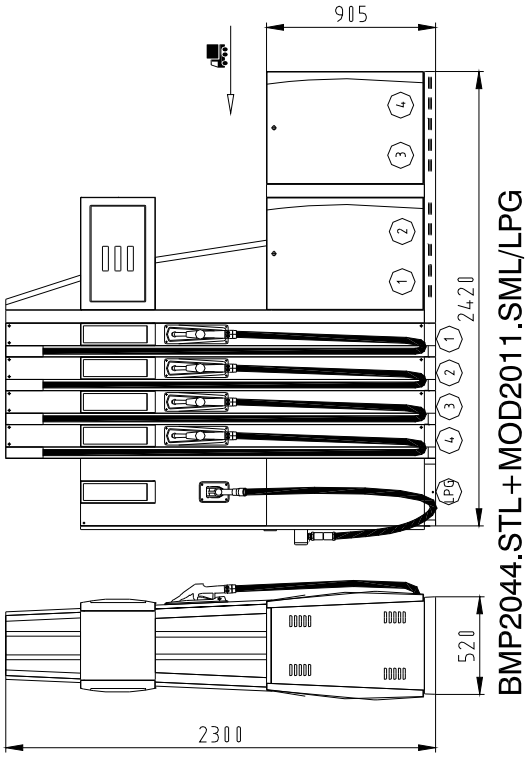



| Pos. | Description | Pos. | Description |
|---|---|---|---|
| ⇦ | Recommended car arrival direction to the dispenser | ①②<br>③④ | Fuel products order |

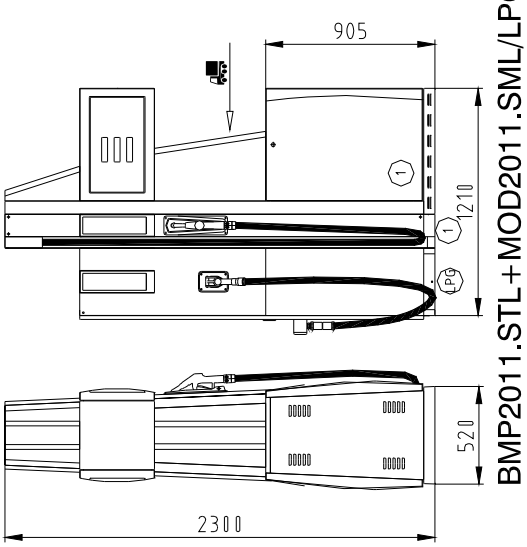
## E.7. Dispensers of Series BMP2000.ST "Tall" with LPG Module "Medium" - one-sided design of the dispenser – left-sided



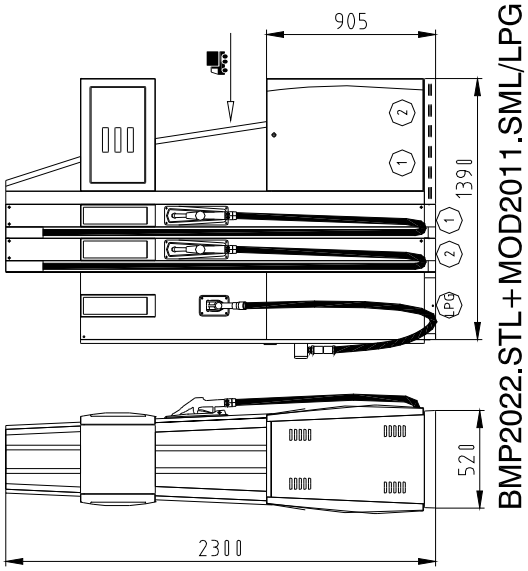

BMP2033.STL+MOD2011.SML/LPG




BMP2044.STL+MOD2011.SML/LPG



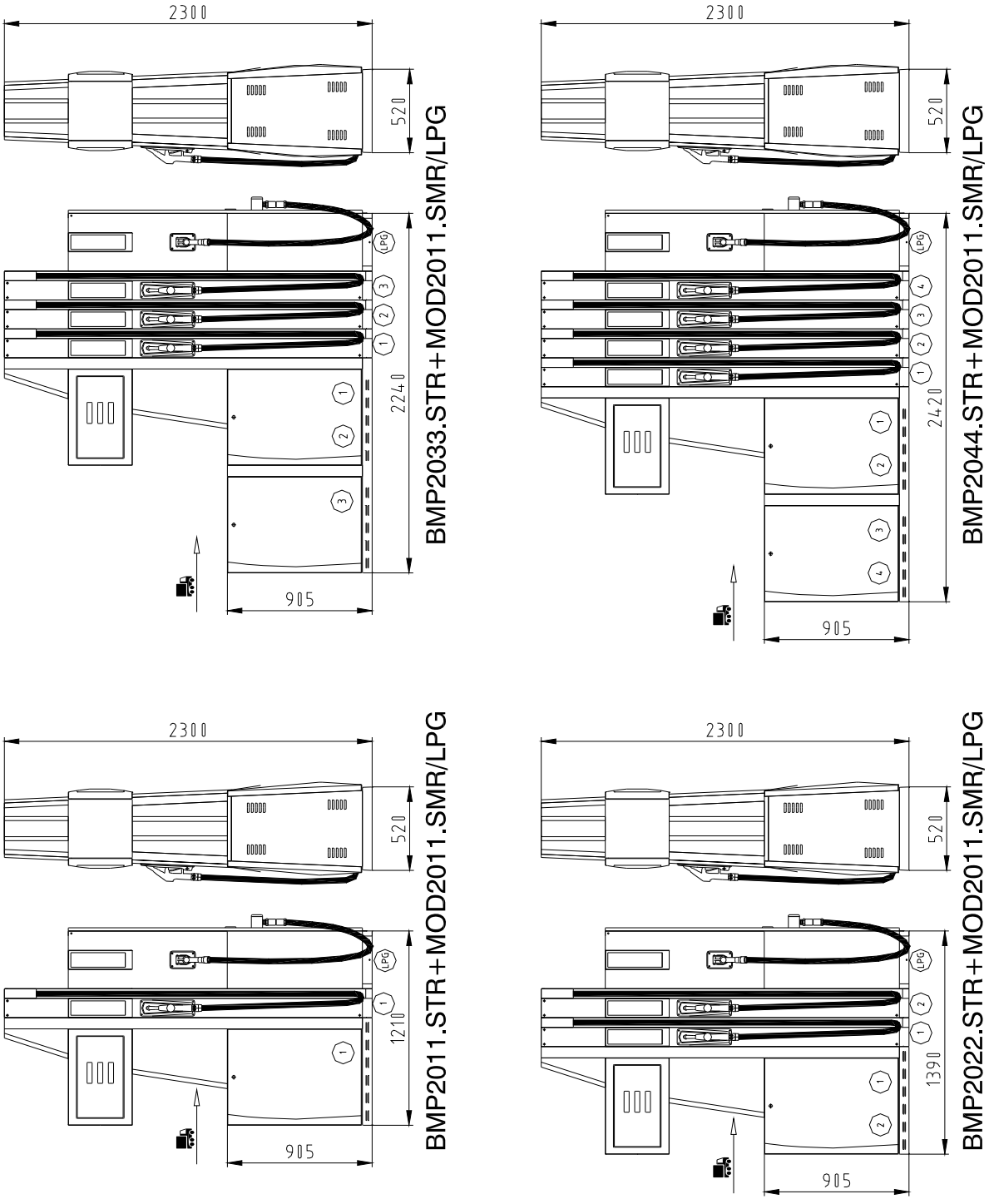

BMP2011.STL+MOD2011.SML/LPG




BMP2022.STL+MOD2011.SML/LPG

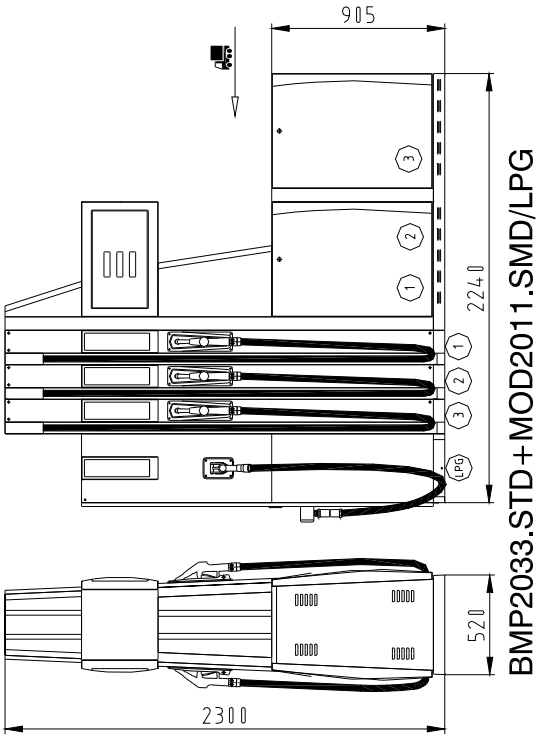
| Pos. | Description | Pos. | Description |
|---|---|---|---|
| ⇦ | Recommended car arrival direction to the dispenser | ①②<br>③④ | Fuel products order |

# E.8. Dispensers of Series BMP2000.ST "Tall" with LPG Module "Medium" - one-sided design of the dispenser – right-sided

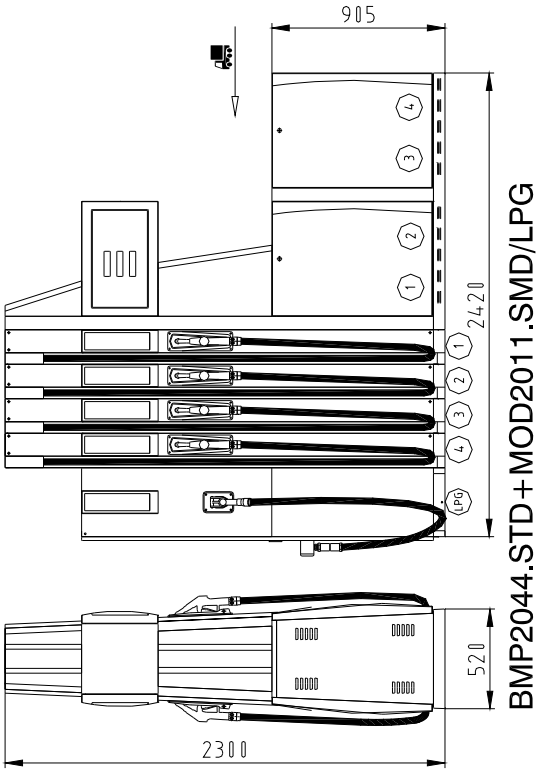



| Pos. | Description | Pos. | Description |
|---|---|---|---|
| ⇦ | Recommended car arrival direction to the dispenser | ①②<br>③④ | Fuel products order |

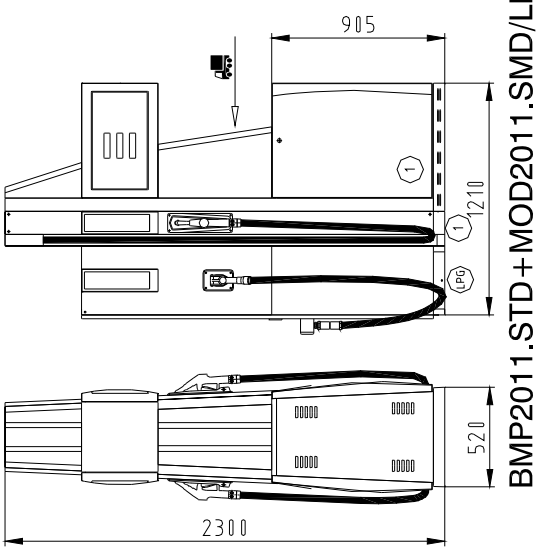
## E.9. Dispensers of Series BMP2000.ST "Tall" with LPG Module "Medium" - double-sided design of the dispenser



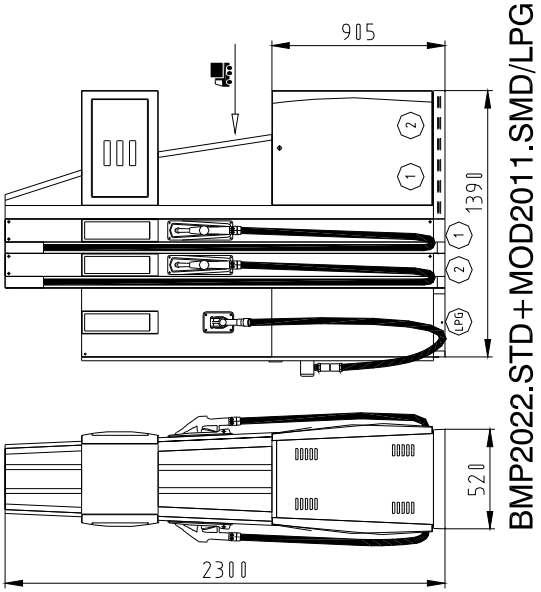

BMP2033.STD+MOD2011.SMD/LPG




BMP2044.STD+MOD2011.SMD/LPG



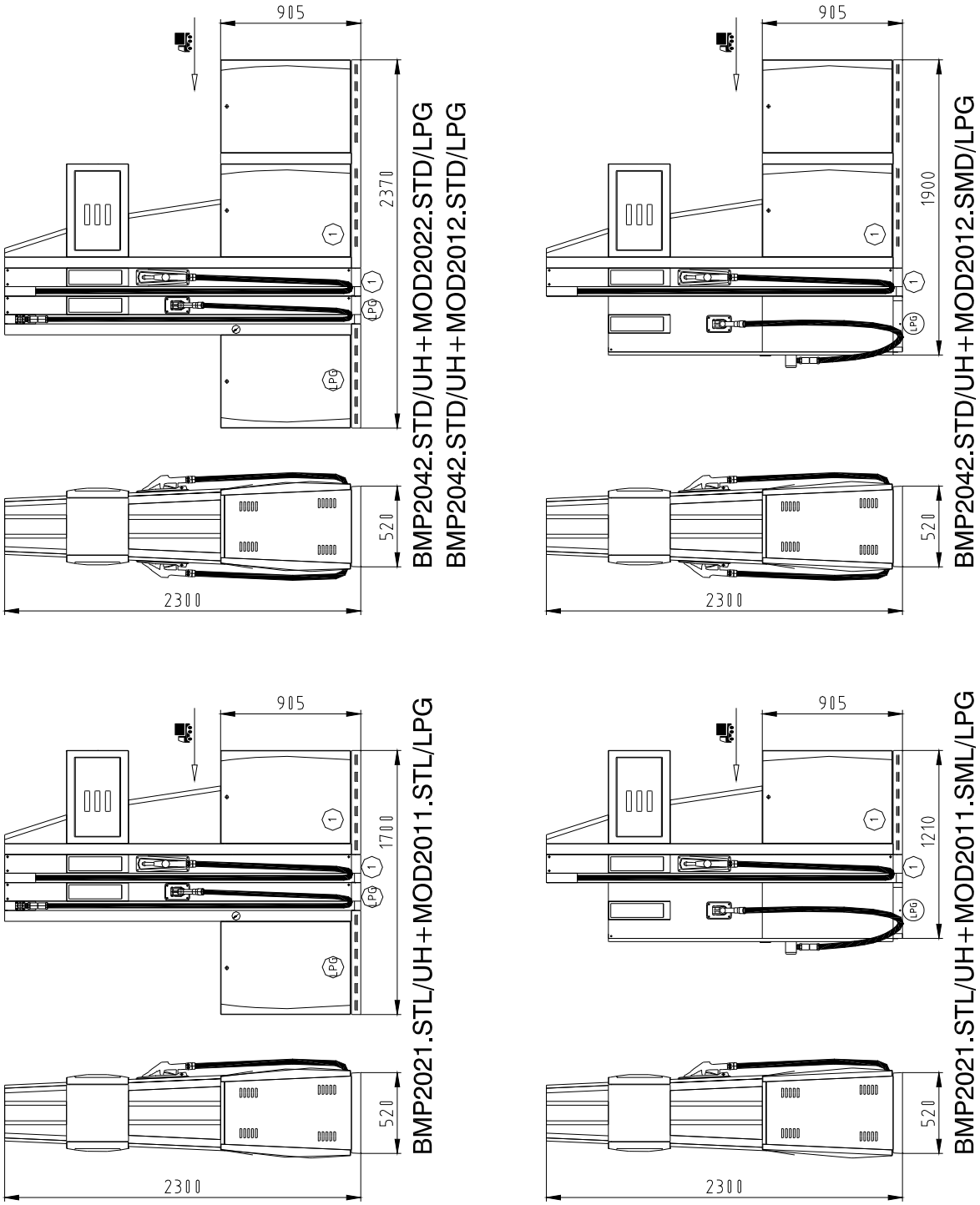

BMP2011.STD+MOD2011.SMD/LPG




BMP2022.STD+MOD2011.SMD/LPG

| Pos. | Description | Pos. | Description |
|---|---|---|---|
| ⇦ | Recommended car arrival direction to the dispenser | ①②<br>③④ | Fuel products order |

# E.10. Dispensers of Series BMP2000.ST "Tall" - design of the dispenser with ultra-high flowrate (/UH)



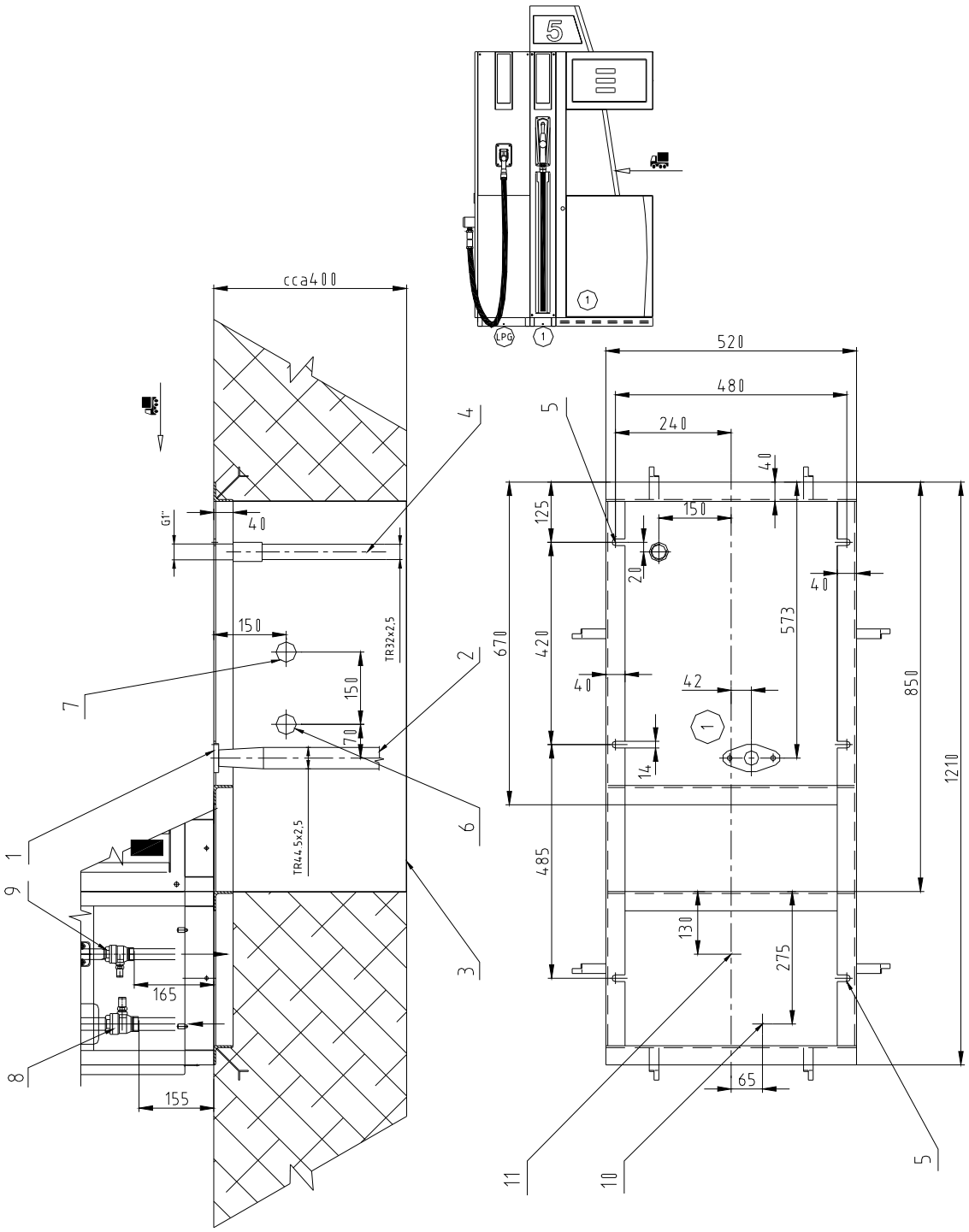

| Pos. | Description | Pos. | Description |
|---|---|---|---|
| ⇦ | Recommended car arrival direction to the dispenser | ①② ③④ | Fuel products order |

# Installation and User Manual
# Appendix F – Foundation plans and Frames

| | |
|---|---|
| Document: | Combined dispensers Liquid Fuel & LPG series SHARK<br>BMP2000.S - Installation and User Manual<br>Appendix F – Foundation plans and Frames |
| Reference: | IN022-EN F_BaseFrames |
| Revision & Datum: | Revision 01, June 10, 2008 |
| Number of pages: | 11 (inclusive of cover) |
| Created by: | Ing. Milan Berka |
| TATSUNO-BENČ EUROPE a.s., Pražská 68, 678 01 Blansko, Czech Republic,<br>tel.+420 516 428411, http://www.benc.cz | |

# F.1. Foundation Plan of Dispensers BMP2012.SMD + MOD2012.SMD/LPG

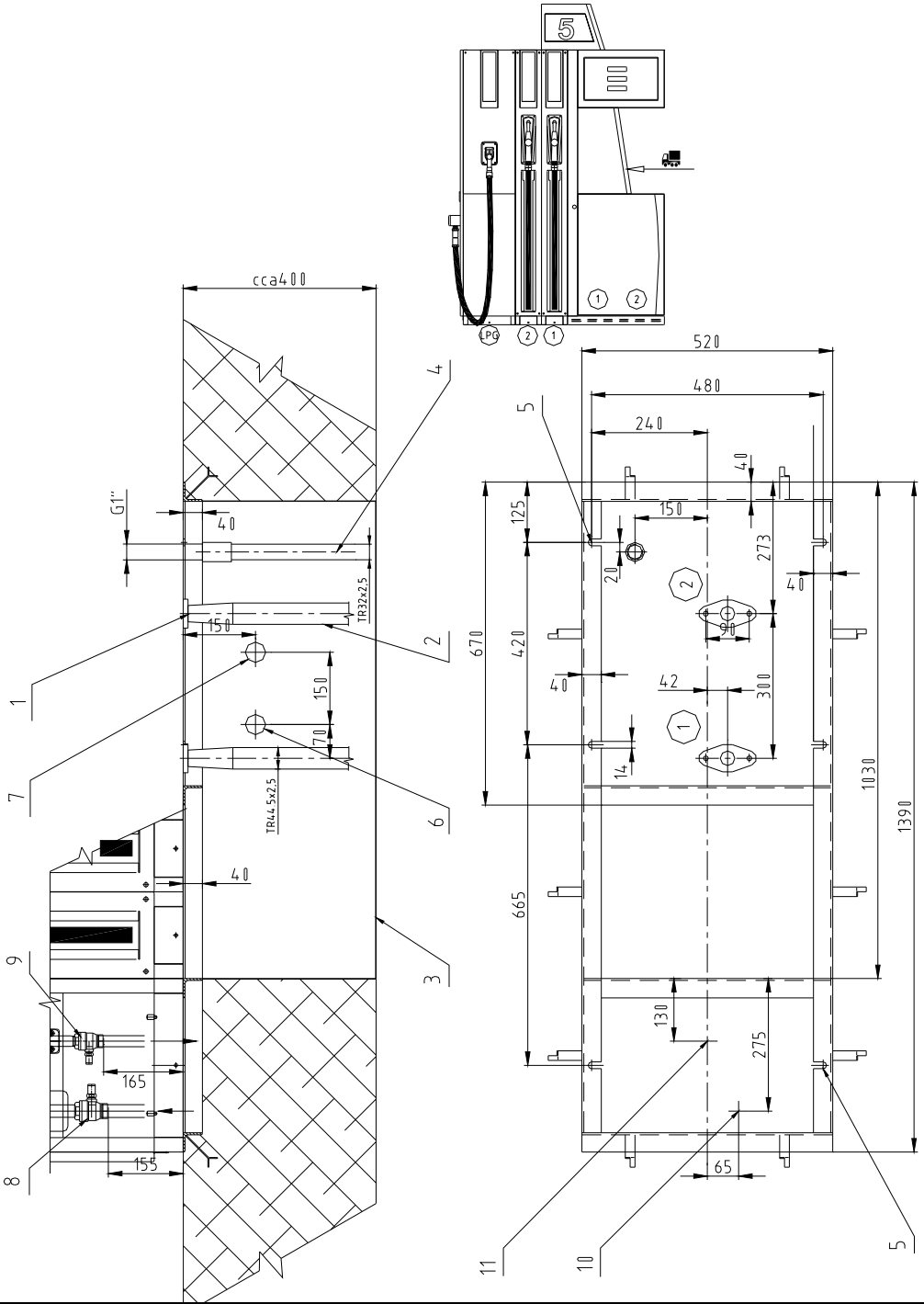
The plan is also valid for variant: BMP2011.SMD+MOD2011.SMD/LPG,
BMP2011.STD+MOD2011.SMD/LPG,
BMP2012.STD+MOD2012.SMD/LPG




| Pos. | Description | Pos. | Description |
|---|---|---|---|
| 1 | Oval flange ČSN 13 1365 - 1 ¼" | 5 | Fastening holes |
| 2 | Suction piping PHM - TR 44.5 x 2.5 | 6 | Electric cables outlet for dispenser feeding |
| 3 | Leakage sump | 7 | Electric cable outlet for communication |
| 4 | Vapour recovery piping TR 32 x 2.5 terminated by inner thread G1" (it is missing in case of diesel pumps) | ⇦ | Recommended car arrival direction to the dispenser |
| 8 | Spherical valve of LPG inlet piping with inner thread G ¾" | 10 | Axis of LPG inlet piping |
| 9 | Spherical valve of LPG return piping with inner thread G ½" | 11 | Axis of LPG return piping |

# F.2. Foundation Plan of Dispensers BMP2024.SMD + MOD2012.SMD/LPG

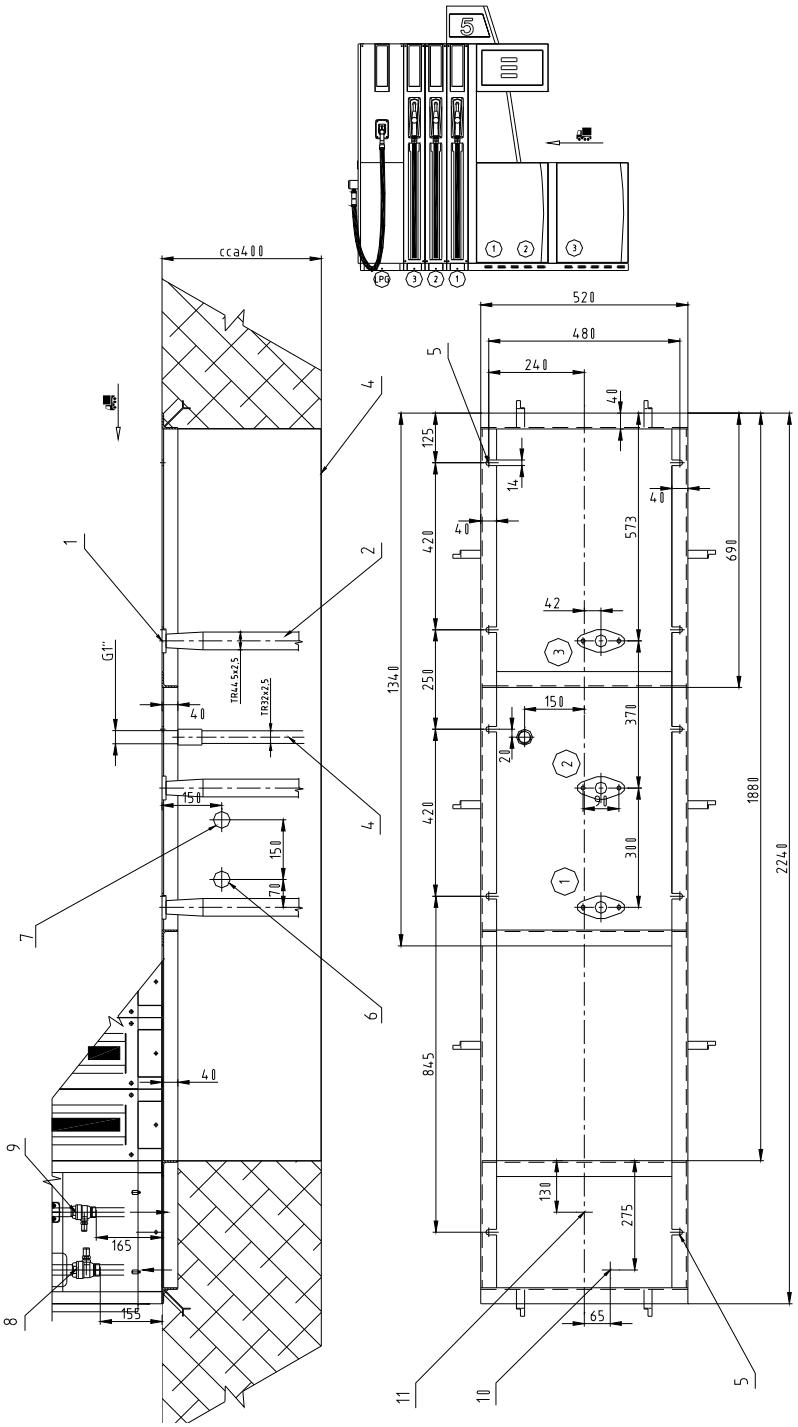
The plan is also valid for variant: BMP2022.SMD+MOD2011.SMD/LPG,
BMP2022.STD+MOD2011.SMD/LPG,
BMP2024.STD+MOD2012.SMD/LPG




| Pos. | Description | Pos. | Description |
|---|---|---|---|
| **1** | Oval flange ČSN 13 1365 - 1 ¼" | **5** | Fastening holes |
| **2** | Suction piping PHM - TR 44.5 x 2.5 | **6** | Electric cables outlet for dispenser feeding |
| **3** | Leakage sump | **7** | Electric cable outlet for communication |
| **4** | Vapour recovery piping TR 32 x 2.5 terminated by inner thread G1" (it is missing in case of diesel pumps) | ⇦ | Recommended car arrival direction to the dispenser |
| | | ①② | Fuel products order |
| **8** | Spherical valve of LPG inlet piping with inner thread G ¾" | **10** | Axis of LPG inlet piping |
| **9** | Spherical valve of LPG return piping with inner thread G ½" | **11** | Axis of LPG return piping |

# F.3. Foundation Plan of Dispensers BMP2036.SMD + MOD2012.SMD/LPG

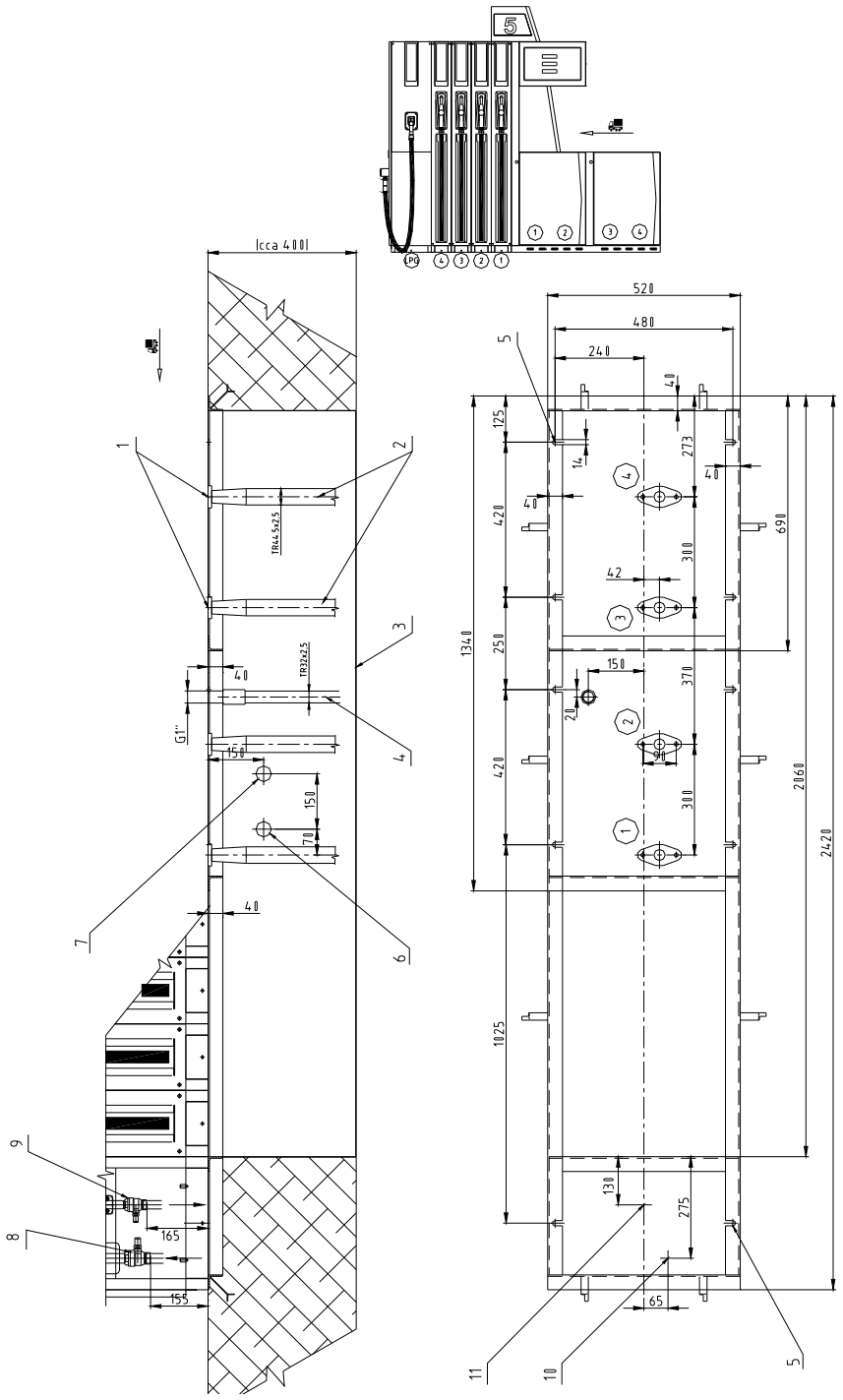
The plan is also valid for variant: BMP2033.SMD+MOD2011.SMD/LPG,
BMP2033.STD+MOD2011.SMD/LPG,
BMP2036.STD+MOD2012.SMD/LPG




| Pos. | Description | Pos. | Description |
|---|---|---|---|
| **1** | Oval flange ČSN 13 1365 - 1 ¼" | **5** | Fastening holes |
| **2** | Suction piping PHM - TR 44.5 x 2.5 | **6** | Electric cables outlet for dispenser feeding |
| **3** | Leakage sump | **7** | Electric cable outlet for communication |
| **4** | Vapour recovery piping TR 32 x 2.5 terminated by inner thread G1" (it is missing in case of diesel pumps) | ⇦ | Recommended car arrival direction to the dispenser |
| | | ①②③ | Fuel products order |
| **8** | Spherical valve of LPG inlet piping with inner thread G ¾" | **10** | Axis of LPG inlet piping |
| **9** | Spherical valve of LPG return piping with inner thread G ½" | **11** | Axis of LPG return piping |

# F.4. Foundation Plan of Dispensers BMP2048.SMD + MOD2012.SMD/LPG

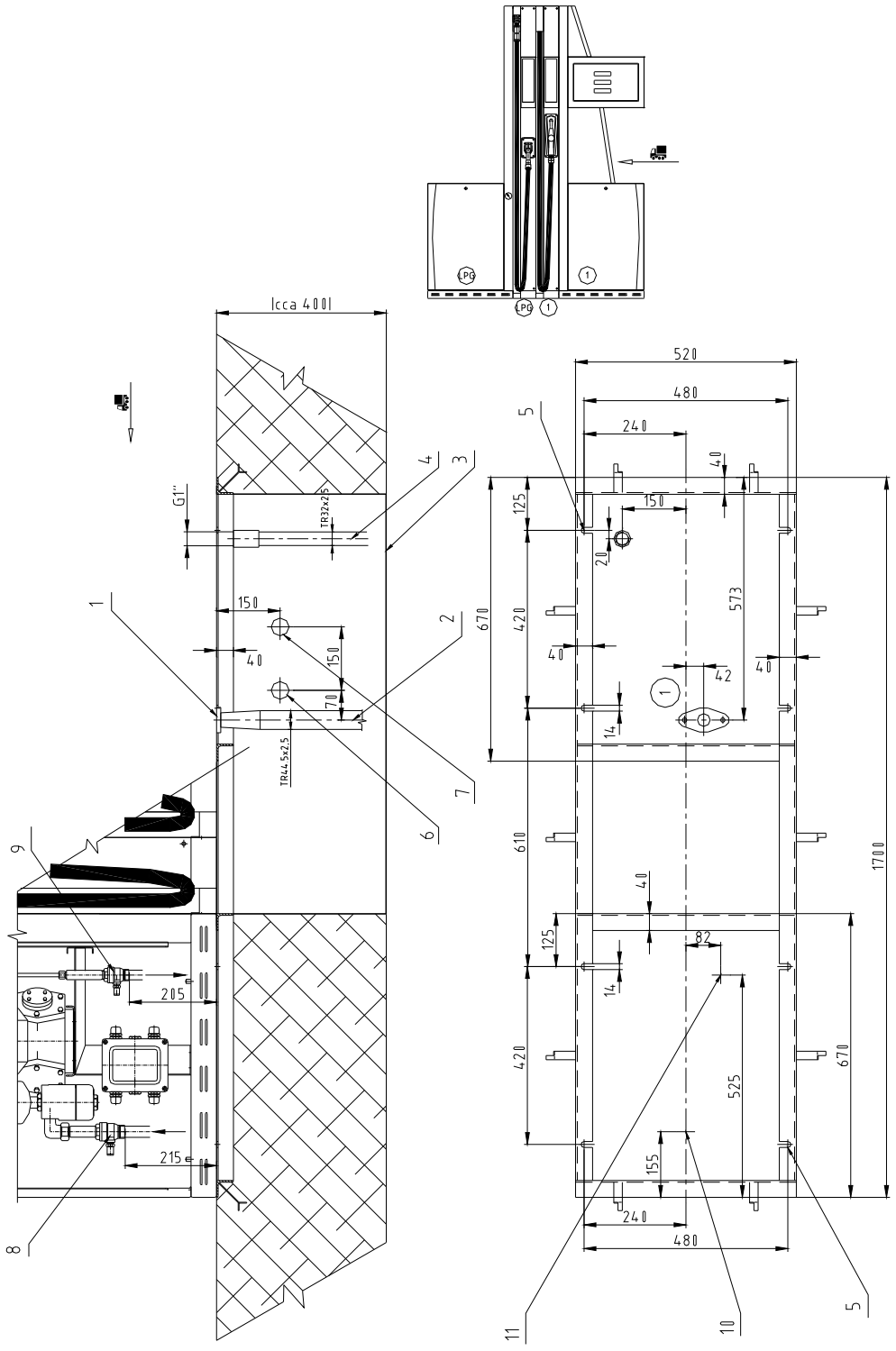
The plan is also valid for variant: BMP2044.SMD+MOD2011.SMD/LPG,
BMP2044.STD+MOD2011.SMD/LPG,
BMP2048.STD+MOD2012.SMD/LPG




| Pos. | Description | Pos. | Description |
|---|---|---|---|
| 1 | Oval flange ČSN 13 1365 - 1 ¼" | 5 | Fastening holes |
| 2 | Suction piping PHM - TR 44.5 x 2.5 | 6 | Electric cables outlet for dispenser feeding |
| 3 | Leakage sump | 7 | Electric cable outlet for communication |
| 4 | Vapour recovery piping TR 32 x 2.5 terminated by inner thread G1" (it is missing in case of diesel pumps) | ⇦ | Recommended car arrival direction to the dispenser |
| | | ①②③④ | Fuel products order |
| 8 | Spherical valve of LPG inlet piping with inner thread G ¾" | 10 | Axis of LPG inlet piping |
| 9 | Spherical valve of LPG return piping with inner thread G ½" | 11 | Axis of LPG return piping |

# F.5. Foundation Plan of Dispensers BMP2012.STD + MOD2012.STD/LPG

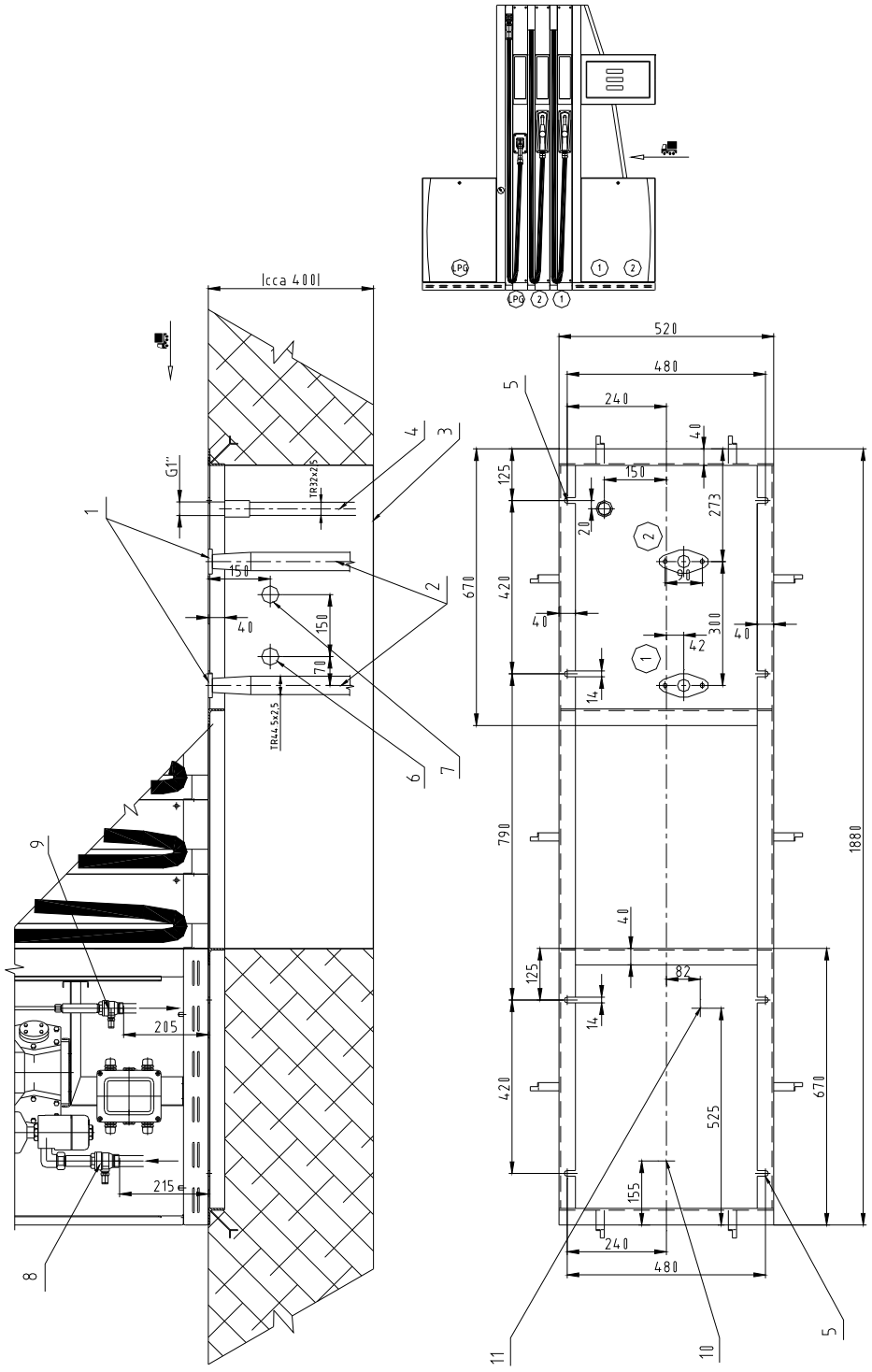
The plan is also valid for variant: BMP2011.STD+MOD2011.STD/LPG




| Pos. | Description | Pos. | Description |
|---|---|---|---|
| 1 | Oval flange ČSN 13 1365 - 1 ¼" | 5 | Fastening holes |
| 2 | Suction piping PHM - TR 44.5 x 2.5 | 6 | Electric cables outlet for dispenser feeding |
| 3 | Leakage sump | 7 | Electric cable outlet for communication |
| 4 | Vapour recovery piping TR 32 x 2.5 terminated by inner thread G1" (it is missing in case of diesel pumps) | ⇦ | Recommended car arrival direction to the dispenser |
| | | ① | Fuel products order |
| 8 | Spherical valve of LPG inlet piping with inner thread G ¾" | 10 | Axis of LPG inlet piping |
| 9 | Spherical valve of LPG return piping with inner thread G ½" | 11 | Axis of LPG return piping |

# F.6. Foundation Plan of Dispensers BMP2024.STD + MOD2012.STD/LPG

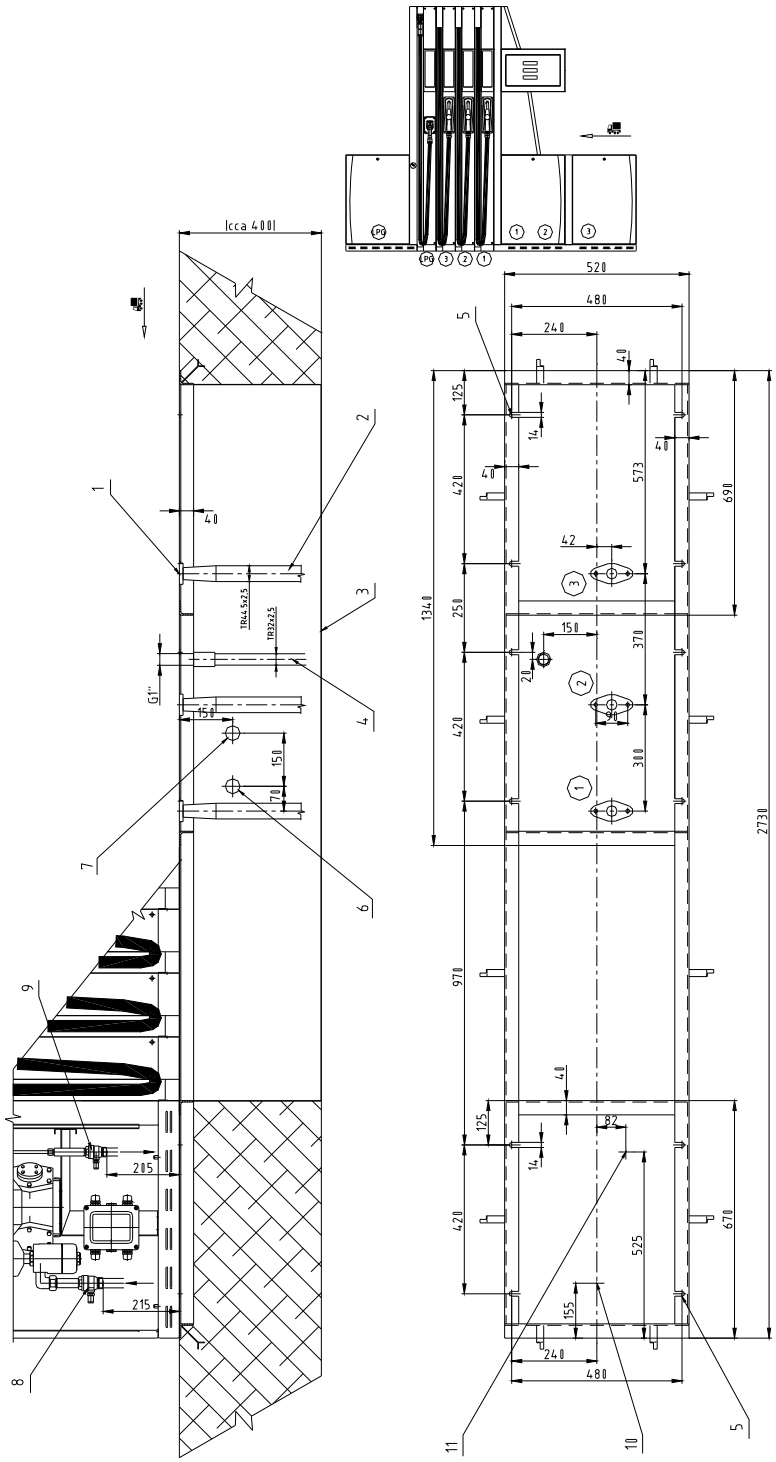
The plan is also valid for variant: BMP2022.STD+MOD2011.STD/LPG




| Pos. | Description | Pos. | Description |
|---|---|---|---|
| **1** | Oval flange ČSN 13 1365 - 1 ¼" | **5** | Fastening holes |
| **2** | Suction piping PHM - TR 44.5 x 2.5 | **6** | Electric cables outlet for dispenser feeding |
| **3** | Leakage sump | **7** | Electric cable outlet for communication |
| **4** | Vapour recovery piping TR 32 x 2.5 terminated by inner thread G1" (it is missing in case of diesel pumps) | ⇦ | Recommended car arrival direction to the dispenser |
| | | ①② | Fuel products order |
| **8** | Spherical valve of LPG inlet piping with inner thread G ¾" | **10** | Axis of LPG inlet piping |
| **9** | Spherical valve of LPG return piping with inner thread G ½" | **11** | Axis of LPG return piping |

# F.7. Foundation Plan of Dispensers BMP2036.STD + MOD2012.STD/LPG

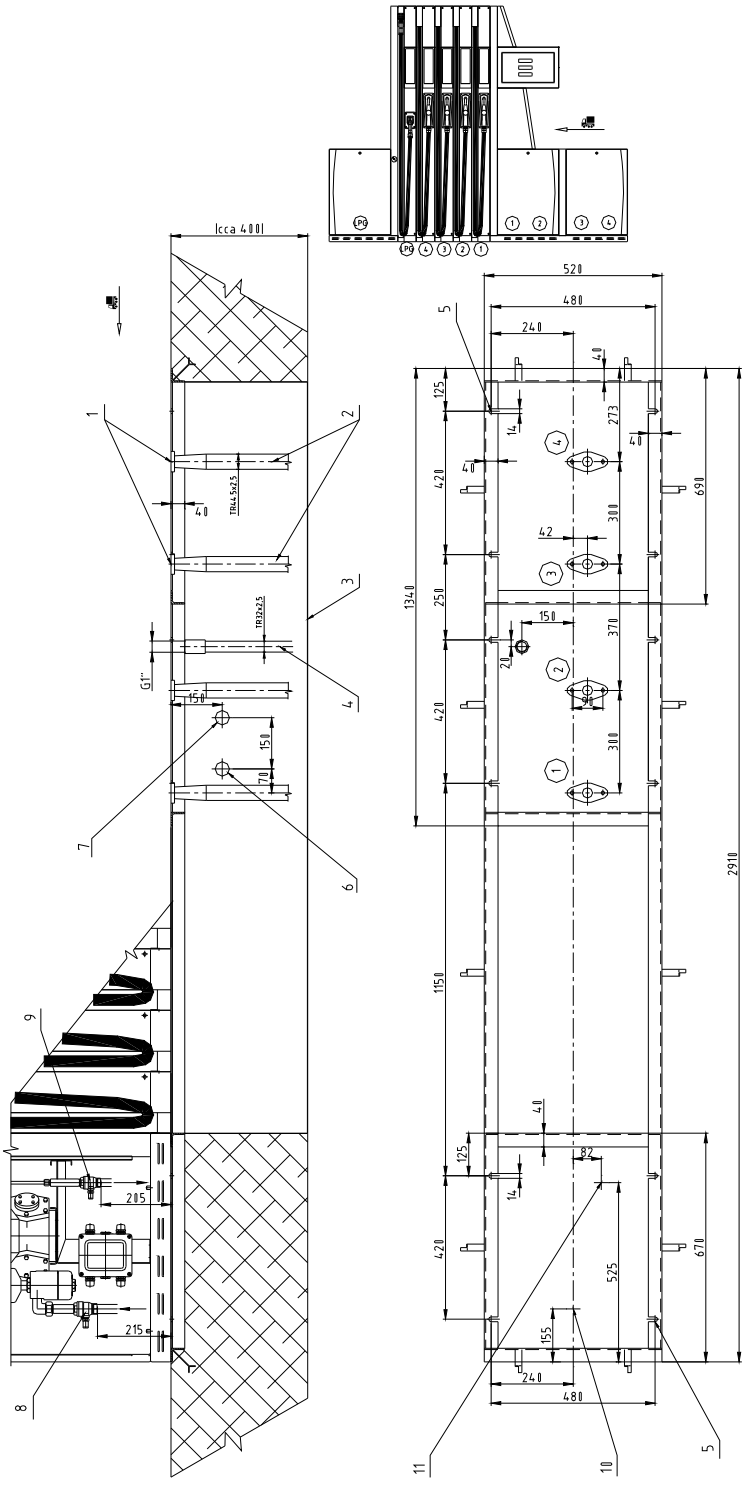
The plan is also valid for variant: BMP2033.STD+MOD2011.STD/LPG




| Pos. | Description | Pos. | Description |
|---|---|---|---|
| **1** | Oval flange ČSN 13 1365 - 1 ¼" | **5** | Fastening holes |
| **2** | Suction piping PHM - TR 44.5 x 2.5 | **6** | Electric cables outlet for dispenser feeding |
| **3** | Leakage sump | **7** | Electric cable outlet for communication |
| **4** | Vapour recovery piping TR 32 x 2.5 terminated by inner thread G1" (it is missing in case of diesel pumps) | ⇦ | Recommended car arrival direction to the dispenser |
| | | ①②③ | Fuel products order |
| **8** | Spherical valve of LPG inlet piping with inner thread G ¾" | **10** | Axis of LPG inlet piping |
| **9** | Spherical valve of LPG return piping with inner thread G ½" | **11** | Axis of LPG return piping |

# F.8. Foundation Plan of Dispensers BMP2048.STD + MOD2012.STD/LPG

The plan is also valid for variant: BMP2044.STD+MOD2011.STD/LPG

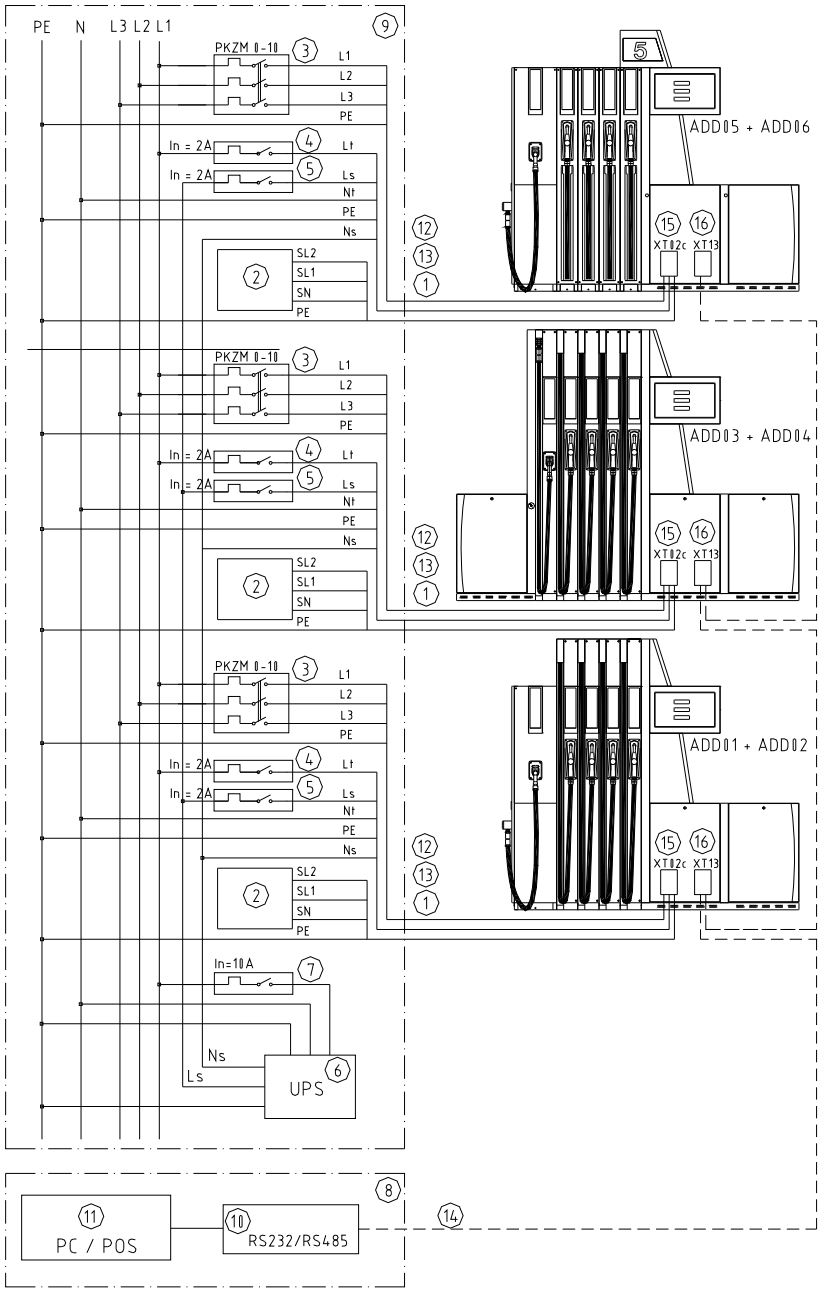



| Pos. | Description | Pos. | Description |
|---|---|---|---|
| **1** | Oval flange ČSN 13 1365 - 1 ¼" | **5** | Fastening holes |
| **2** | Suction piping PHM - TR 44.5 x 2.5 | **6** | Electric cables outlet for dispenser feeding |
| **3** | Leakage sump | **7** | Electric cable outlet for communication |
| **4** | Vapour recovery piping TR 32 x 2.5 terminated by inner thread G1" (it is missing in case of diesel pumps) | ⇦ | Recommended car arrival direction to the dispenser |
| | | ①②③④ | Fuel products order |
| **8** | Spherical valve of LPG inlet piping with inner thread G ¾" | **10** | Axis of LPG inlet piping |
| **9** | Spherical valve of LPG return piping with inner thread G ½" | **11** | Axis of LPG return piping |

# Installation and User Manual
# Appendix G – Wiring Diagrams

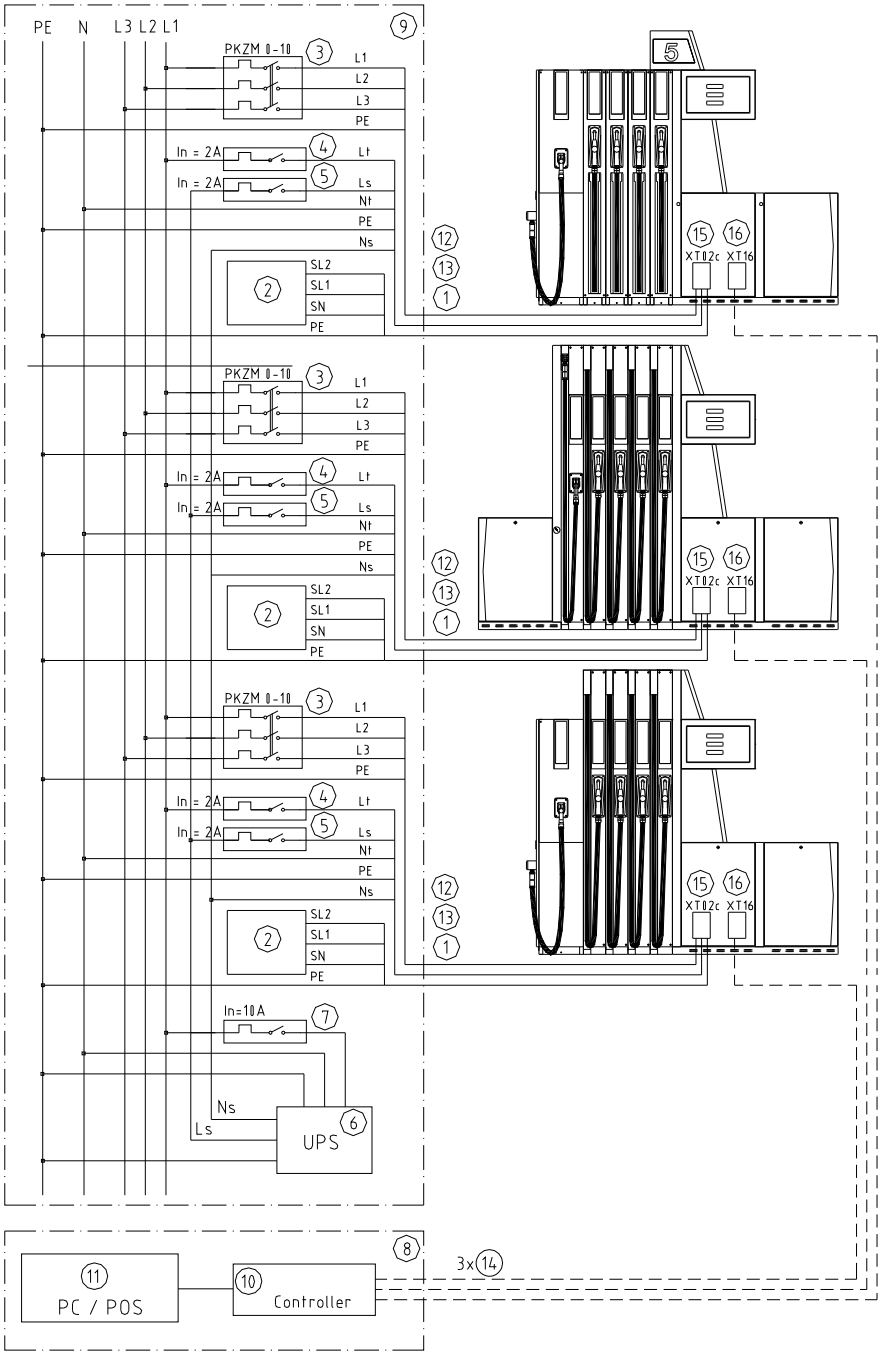
| | |
|---|---|
| Document: | Combined dispensers Liquid Fuel & LPG series SHARK<br>BMP2000.S - Installation and User Manual<br>Appendix G – Wiring Diagrams |
| Reference: | IN022-EN G_Electrical Schemes |
| Revision & Date: | Revision 01, June 10, 2008 |
| Number of pages: | 9 (inclusive of cover) |
| Produced by: | Ing. Milan Berka |
| TATSUNO-BENČ EUROPE a.s., Pražská 68, 678 01 Blansko, Czech Republic,<br>tel.+420 516 428411, http://www.benc.cz | |

# G.1. Wiring Diagram of Dispensers with PDE Counters and PDE Interface (or with PDE counter with data interface ADP, DART, IFSF)



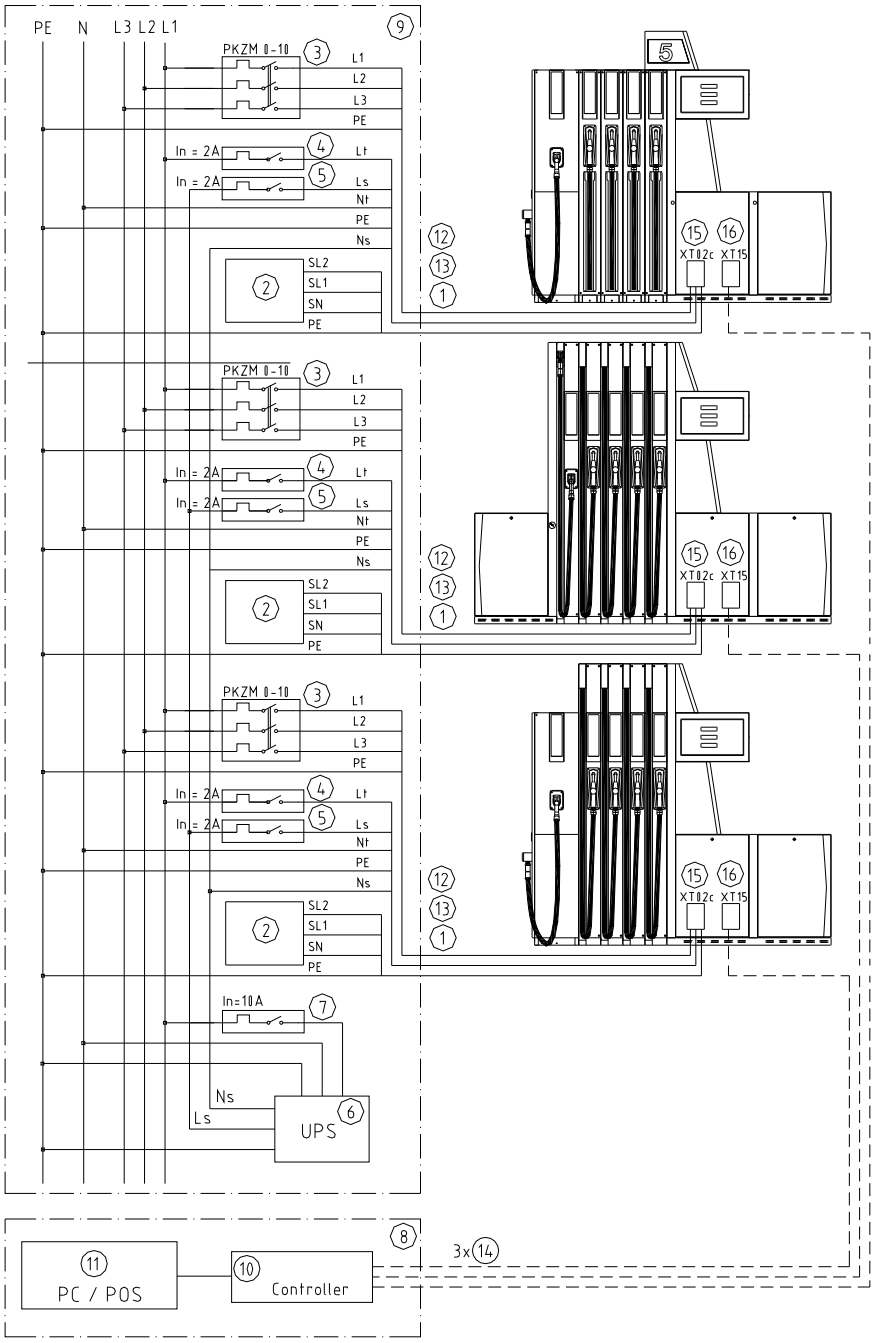

| Pos. | Description | Pos. | Description |
|---|---|---|---|
| 1 | LPG pump switching cable - type Faber Kabel YJ-Z 4 x 1.5 | 9 | Main distribution box of the filling station technology |
| 2 | LPG pump control placed in the kiosk | 10 | Data converter (RS485 / RS232) |
| 3 | Motor circuit breaker with short-circuit and thermal release | 11 | Control device (PC, POS, controller, console BG16, etc.) |
| 4 | Overcurrent circuit breaker for switching elements and valves - In=2A | 12 | Motor feeding cable - type Faber Kabel YJ-Z 4 x 1.5 |
| 5 | Overcurrent circuit breaker for counter feeding - In=2A | 13 | Counter feeding cable - type Faber Kabel Y-JB 5 x 1.5 |
| 6 | Standby source UPS with feeding stabilisation | 14 | Shielded data line - type Faber Kabel CY-JZ 5 x 0.75 |
| 7 | Overcurrent circuit breaker of UPS standby source | 15 | Power distribution box of the combined dispenser XT02c |
| 8 | Operator's working place (the kiosk) | 16 | Communication distribution box XT13 |

# G.2. Wiring Diagram of Dispensers with Counter Hectronic ER4 (or with counter PDE with data interface ER4)



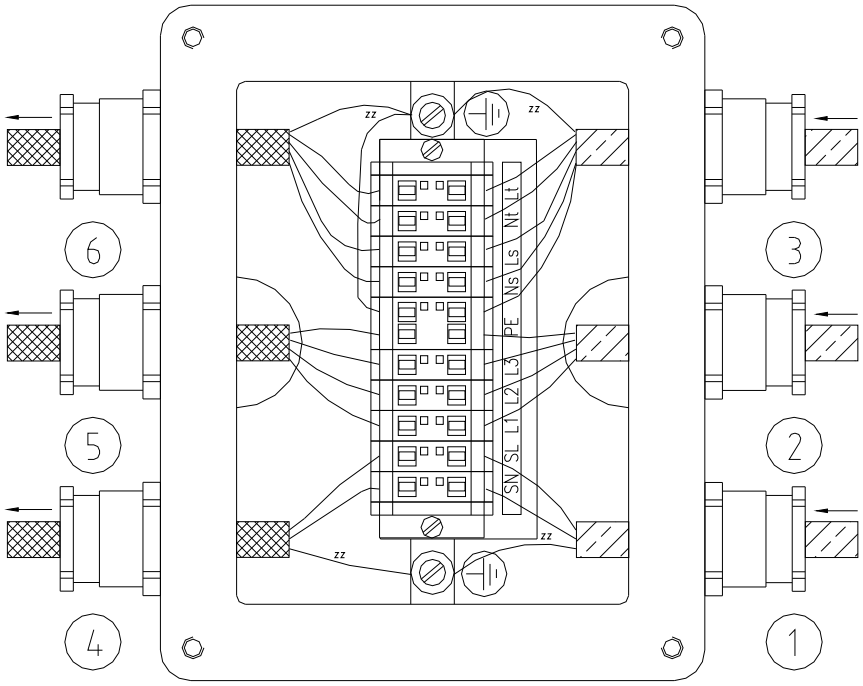

| Pos. | Description | Pos. | Description |
|---|---|---|---|
| 1 | LPG pump switching cable - type Faber Kabel YJ-Z 4 x 1.5 | 9 | Main distribution box of the filling station technology |
| 2 | LPG pump control placed in the kiosk | 10 | Controller (Koppelelektronik, TMS10, TMS20, DOMS,.etc.) |
| 3 | Motor circuit breaker with short-circuit and thermal release | 11 | Control device (PC, POS, KSE2094, TSE2020, etc.) |
| 4 | Overcurrent circuit breaker for switching elements and valves - In=2A | 12 | Motor feeding cable - type Faber Kabel YJ-Z 4 x 1.5 |
| 5 | Overcurrent circuit breaker for counter feeding - In=2A | 13 | Counter feeding cable - type Faber Kabel Y-JB 5 x 1.5 |
| 6 | Standby source UPS with feeding stabilisation | 14 | Shielded data line - type Faber Kabel CY-JZ 5 x 0.75 |
| 7 | Overcurrent circuit breaker of UPS standby source | 15 | Power distribution box of the combined dispenser XT02c |
| 8 | Operator's working place (the kiosk) | 16 | Communication distribution box XT16 |

## G.3. Wiring Diagram of Dispensers with Counter Logitron (or with counter PDE with data interface Logitron PUMA LAN )




| Pos. | Description | Pos. | Description |
|---|---|---|---|
| **1** | LPG pump switching cable - type Faber Kabel YJ-Z 4 x 1.5 | **9** | Main distribution box of the filling station technology |
| **2** | LPG pump control placed in the kiosk | **10** | Controller (console BG16, DOMS, PUMA HOST,...etc.) |
| **3** | Motor circuit breaker with short-circuit and thermal release | **11** | Control device (PC, POS, console BG16,...etc.) |
| **4** | Overcurrent circuit breaker for switching elements and valves - In=2A | **12** | Motor feeding cable - type Faber Kabel YJ-Z 4 x 1.5 |
| **5** | Overcurrent circuit breaker for counter feeding - In=2A | **13** | Counter feeding cable - type Faber Kabel Y-JB 5 x 1.5 |
| **6** | Standby source UPS with feeding stabilisation | **14** | Shielded data line - type Faber Kabel CY-JZ 5 x 0.75 |
| **7** | Overcurrent circuit breaker of UPS standby source | **15** | Power distribution box of the combined dispenser XT02c |
| **8** | Operator's working place (the kiosk) | **16** | Communication distribution box XT15 |

# G.4. Power Distribution Box Diagram XT02c




## Input

| 1 | LPG pump switching power cable<br>Type: Y-JZ 4 x 1.5 (recommended)<br>Interconnection: main switchboard <---> XT02c | |
|---|---|---|
| SL | LPG pump switching phase No.1 | black 1 |
| - | unused | black 2 |
| SN | motor feeding phase | black 3 |
| PE | protective conductor | green and yellow(zz) |

| 2 | Motor feeding power cable<br>Type: Y-JZ 4 x 1.5 (recommended)<br>Interconnection: main switchboard <---> XT02c | |
|---|---|---|
| L1 | motor feeding phase | black 1 |
| L2 | motor feeding phase | black 2 |
| L3 | motor feeding phase | black 3 |
| PE | protective conductor | green and yellow (zz) |

| 3 | Counter feeding power cable<br>Type: Y-JB 5 x 1.5 (recommended)<br>Interconnection: main switchboard <---> XT02c | |
|---|---|---|
| Ns | zero conductor for counter feeding | grey |
| Ls | counter feeding phase | brown |
| Nt | zero conductor for valves and switches | blue |
| Lt | phase for valves and switches | black |
| PE | protective conductor | green and yellow (zz) |

## Output

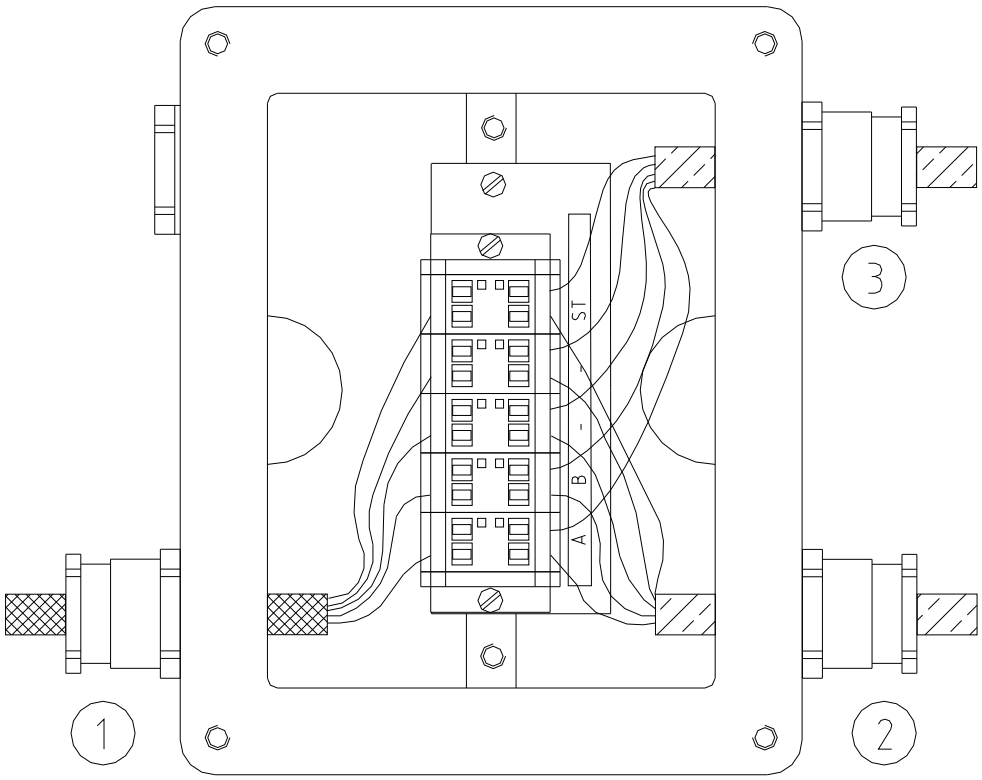
| 4 | LPG pump switching power cable<br>Type: Y-JZ 4 x 1.5<br>Interconnection: XT02c <---> dispenser head | |
|---|---|---|
| SL | LPG pump switching phase No.1 | black 1 |
| - | unused | black 2 |
| SN | motor feeding phase | black 3 |
| PE | protective conductor | green and yellow (zz) |

| 5 | Motor feeding power cable<br>Type: Y-JZ 4 x 1.5<br>Interconnection: XT02c <---> dispenser head | |
|---|---|---|
| L1 | motor feeding phase | black 1 |
| L2 | motor feeding phase | black 2 |
| L3 | motor feeding phase | black 3 |
| PE | protective conductor | green and yellow (zz) |

| 6 | Counter feeding power cable<br>Type: Y-JB 5 x 1.5<br>Interconnection: XT02c <---> dispenser head | |
|---|---|---|
| Ns | zero conductor for counter feeding | grey |
| Ls | counter feeding phase | brown |
| Nt | zero conductor for valves and switches | blue |
| Lt | phase for valves and switches | black |
| PE | protective conductor | green and yellow (zz) |

**Notice:**
Distribution box type RK 002/6 is of approved design Ex II 2G EEx e II T6 with certificate FTZÚ 02 ATEX 0021. Inside box should be used only WAGO clamps type 262-130 a 262-230 that are of approved design EEx e II. Maximum load of one clamp is 10A/400V. Allowed wire cross-sections are in range 0.5 to 2.5 mm$^2$. Length of unisolated part of wire is min. 9 mm and max. 10 mm.

## G.5. Communication Distribution Box Diagram XT13




## Input

| 1 | Shielded data cable for communication line<br>Type: CY-JZ 5 x 0.75 (recommended)<br>Interconnection: kiosk/dispenser <---> XT13 | |
|---|---|---|
| **A** | Line A | black 1 |
| **B** | Line B | black 2 |
| **-** | unused | black 3 |
| **-** | unused | black 4 |
| **-** | unused | green and yellow |
| **ST** | cable shielding | shielding (st) |

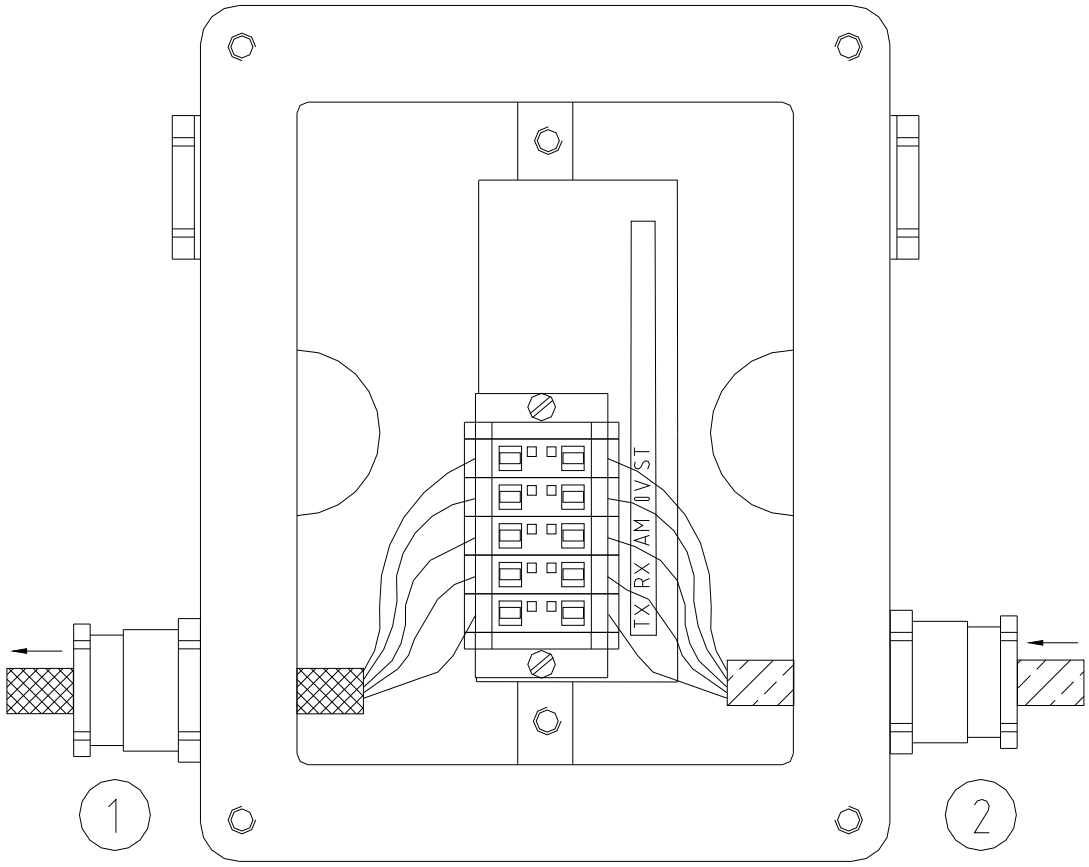
## Output

| 2 | Shielded data cable for communication line<br>Type: CY-JZ 5 x 0.75 (recommended)<br>Interconnection: XT13 <---> another dispenser | |
|---|---|---|
| **A** | Line A | black 1 |
| **B** | Line B | black 2 |
| **-** | unused | black 3 |
| **-** | unused | black 4 |
| **-** | unused | green and yellow |
| **ST** | cable shielding | shielding (st) |

| 3 | Shielded data cable for communication line<br>Type: CY-JZ 5 x 0.75<br>Interconnection: XT13 <---> dispenser counter | |
|---|---|---|
| **A** | Line A | black 1 |
| **B** | Line B | black 2 |
| **-** | unused | black 3 |
| **-** | unused | black 4 |
| **-** | unused | green and yellow |
| **ST** | cable shielding | shielding (st) |

**Notice:**
Distribution box type RK 002/6 is of approved design Ex II 2G EEx e II T6 with certificate FTZÚ 02 ATEX 0021. Inside box should be used only WAGO clamps type 262-130 a 262-230 that are of approved design EEx e II. Maximum load of one clamp is 10A/400V. Allowed wire cross-sections are in range 0.5 to 2.5 $mm^2$. Length of unisolated part of wire is min. 9 mm and max. 10 mm.

## G.6. Communication Distribution Box Diagram XT15




## Input

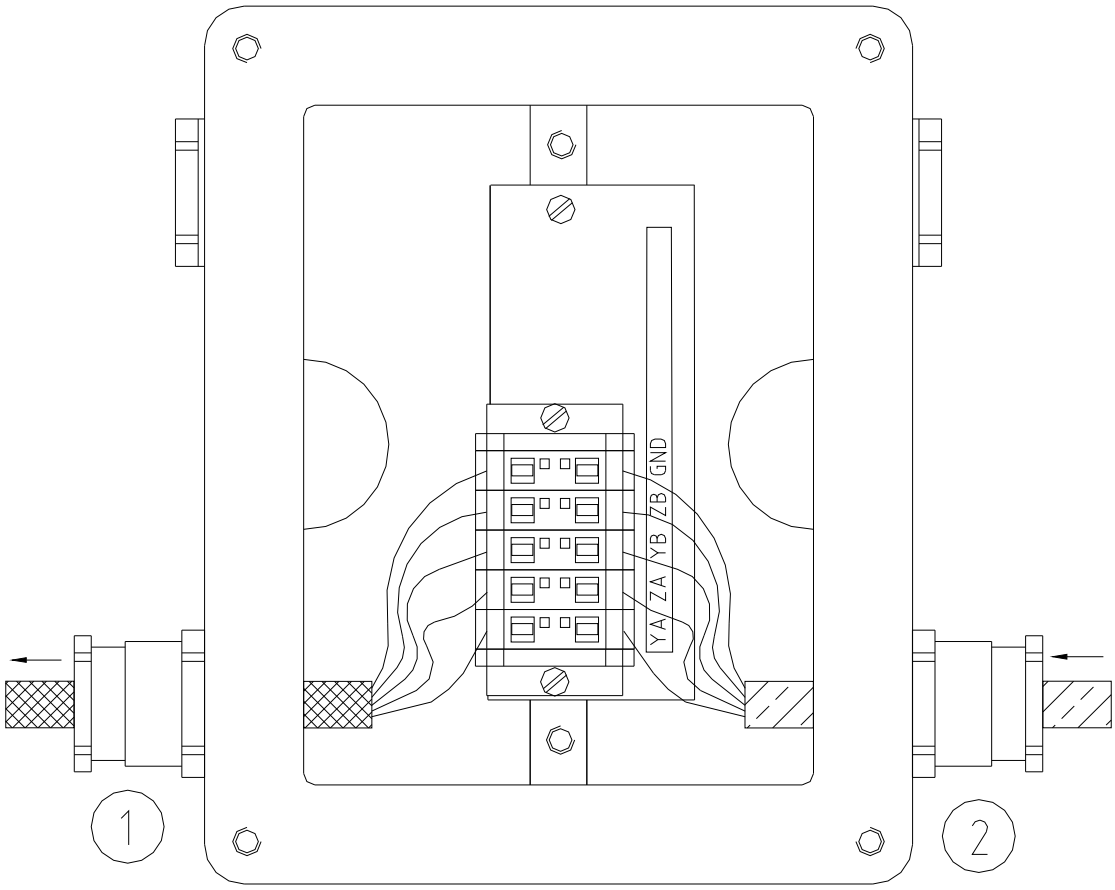
| 1 | Shielded data cable for communication line<br>Type: CY-JZ 5 x 0.75 (recommended)<br>Interconnection: kiosk/dispenser <---> XT15 | |
|---|---|---|
| **TX** | signal Tx (transmission) | black 1 |
| **RX** | signal Rx (downloading) | black 2 |
| **AM** | signal Automatics / Manual | black 3 |
| **0V** | signal ground | black 4 |
| **-** | unused | green and yellow |
| **ST** | cable shielding | shielding (st) |

## Output

| 2 | Shielded data cable for communication line<br>Type: CY-JZ 5 x 0.75<br>Interconnection: XT15 <---> dispenser counter | |
|---|---|---|
| **TX** | signal Tx (transmission) | black 1 |
| **RX** | signal Rx (downloading) | black 2 |
| **AM** | signal Automatics / Manual | black 3 |
| **0V** | signal ground | black 4 |
| **-** | unused | green and yellow |
| **ST** | cable shielding | shielding (st) |

**Notice:**
Distribution box type RK 002/6 is of approved design Ex II 2G EEx e II T6 with certificate FTZÚ 02 ATEX 0021. Inside box should be used only WAGO clamps type 262-130 a 262-230 that are of approved design EEx e II. Maximum load of one clamp is 10A/400V. Allowed wire cross-sections are in range 0.5 to 2.5 $mm^2$. Length of unisolated part of wire is min. 9 mm and max. 10 mm.

## G.7. Communication Distribution Box Diagram XT16




## Input

| 1 | Shielded data cable for communication line<br>Type: CY-JZ 5 x 0.75 (recommended)<br>Interconnection: kiosk/dispenser <---> XT16 | |
|---|---|---|
| **YA** | current loop for side A | black 1 |
| **ZA** | current loop for side A | black 2 |
| **YB** | current loop for side B | black 3 |
| **ZB** | current loop for side B | black 4 |
| **-** | unused | green and yellow |
| **ST** | cable shielding | shielding (st) |

## Output

| 2 | Shielded data cable for communication line<br>Type: CY-JZ 5 x 0.75<br>Interconnection: XT16 <---> dispenser counter | |
|---|---|---|
| **YA** | current loop for side A | black 1 |
| **ZA** | current loop for side A | black 2 |
| **YB** | current loop for side B | black 3 |
| **ZB** | current loop for side B | black 4 |
| **-** | unused | green and yellow |
| **ST** | cable shielding | shielding (st) |

**Notice:**
Distribution box type RK 002/6 is of approved design Ex II 2G EEx e II T6 with certificate FTZÚ 02 ATEX 0021. Inside box should be used only WAGO clamps type 262-130 a 262-230 that are of approved design EEx e II. Maximum load of one clamp is 10A/400V. Allowed wire cross-sections are in range 0.5 to 2.5 mm$^2$. Length of unisolated part of wire is min. 9 mm and max. 10 mm.

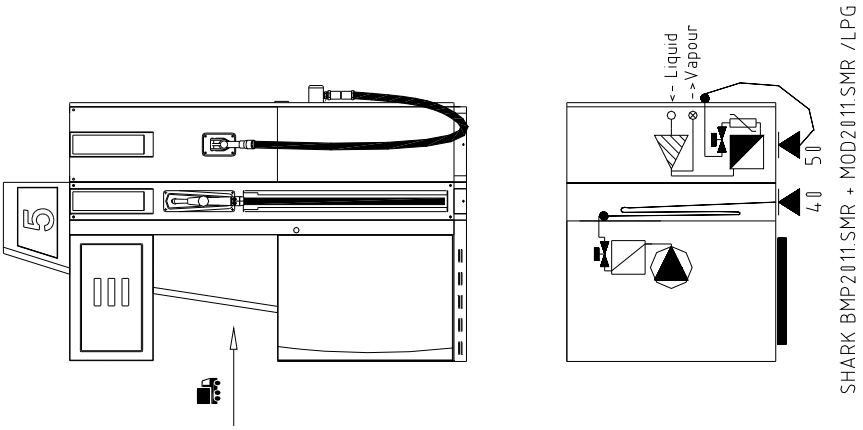
# Installation and User Manual
# Appendix H – Hydraulic System Diagrams

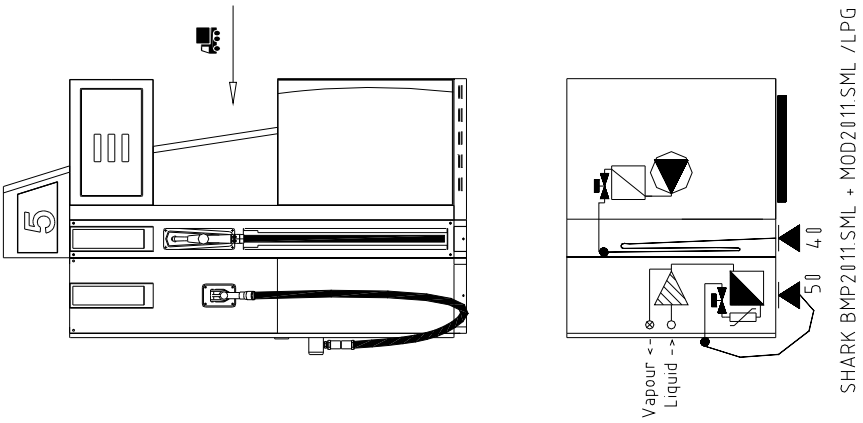
| | |
|---|---|
| Document: | Combined dispensers Liquid Fuel & LPG series SHARK<br>BMP2000.S - Installation and User Manual<br>Appendix H – Hydraulic System Diagrams |
| Reference: | IN022-EN H_HydraulicsSchemes |
| Revision & Date: | Revision 01, June 10, 2008 |
| Number of pages: | 15 (inclusive of cover) |
| Created by: | Ing. Milan Berka |
| TATSUNO-BENČ EUROPE a.s., Pražská 68, 678 01 Blansko, Czech Republic,<br>tel.+420 516 428411, http://www.benc.cz | |

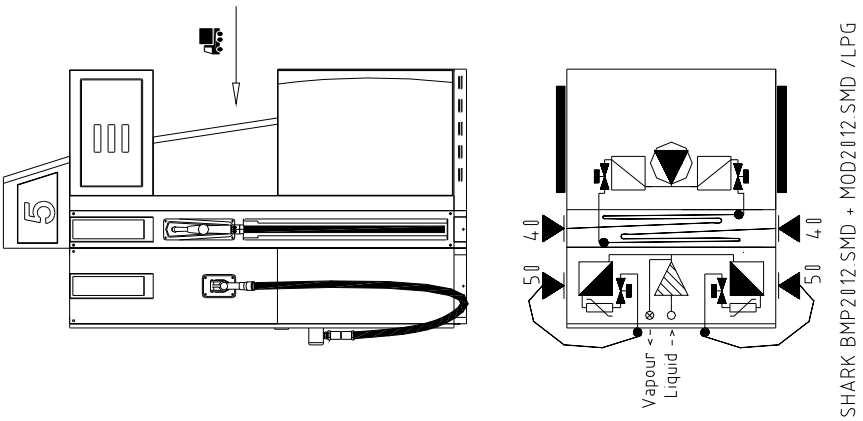
## H.1. Legend of Graphical Symbols

| Symbol | Description | Symbol | Description |
|---|---|---|---|
| ①②③④ | Fuel products order | | Dispensing nozzle |
| | Liquid fuel pumping unit - 50 L/min (pumping monoblock) | | Dispensing hose outlet |
| | Liquid fuel pumping unit - 90 L/min (pumping monoblock) | | Liquid fuel or LPG inlet |
| | PHM measuring unit (meter) | | Outlet of gaseous phase LPG |
| | LPG measuring unit (meter) |  | Main display (Master) |
| | LPG separator of gaseous phase from liquid phase |  | Secondary display (Slave) |
| | Differential valve LPG |  | Display in configuration Master/Master |
| | Solenoid valve |  | Display in configuration Master/Slave |

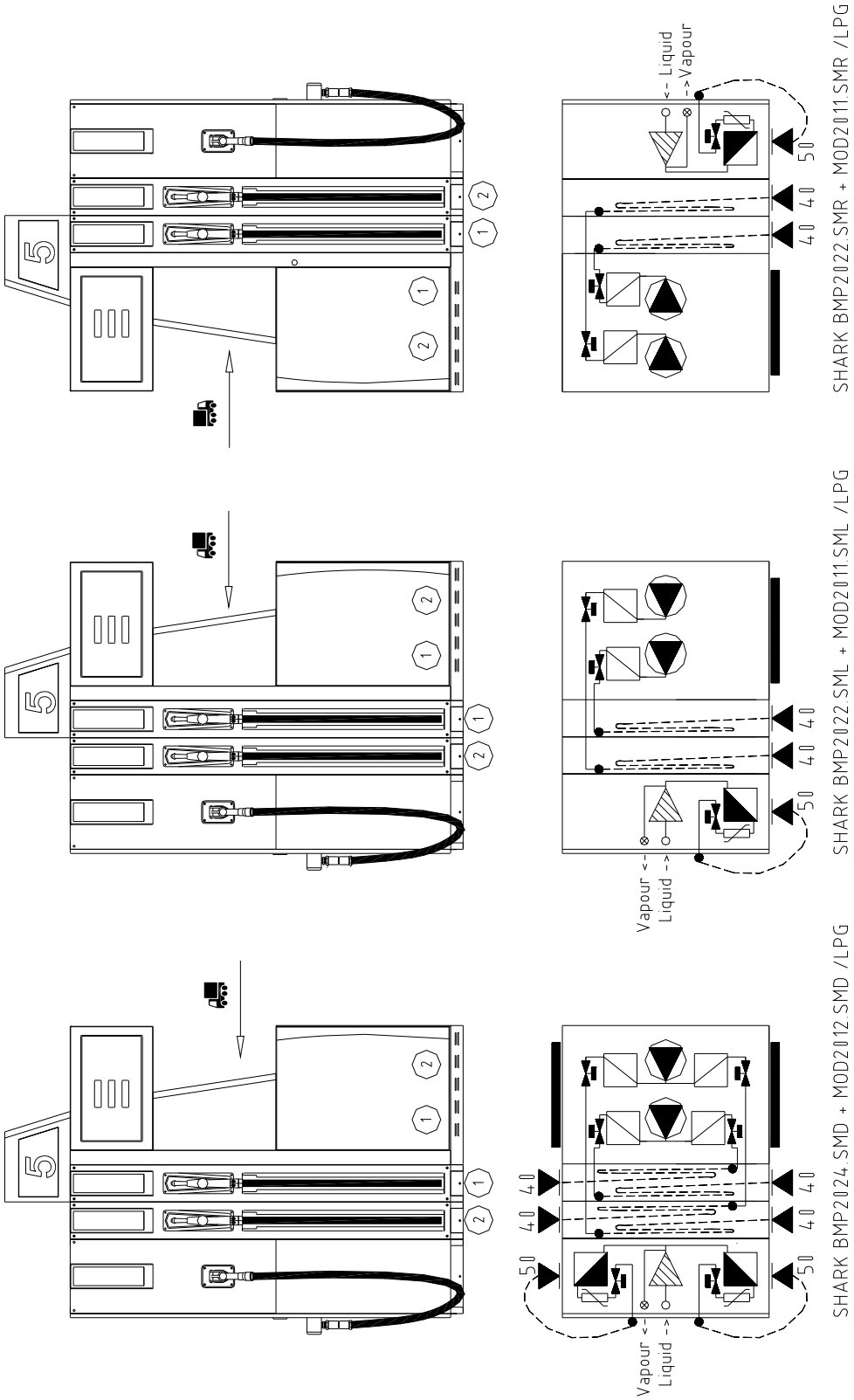
# H.2. Dispensers SHARK BMP2000.SM with Module MOD2000.SM/LPG - one-product design



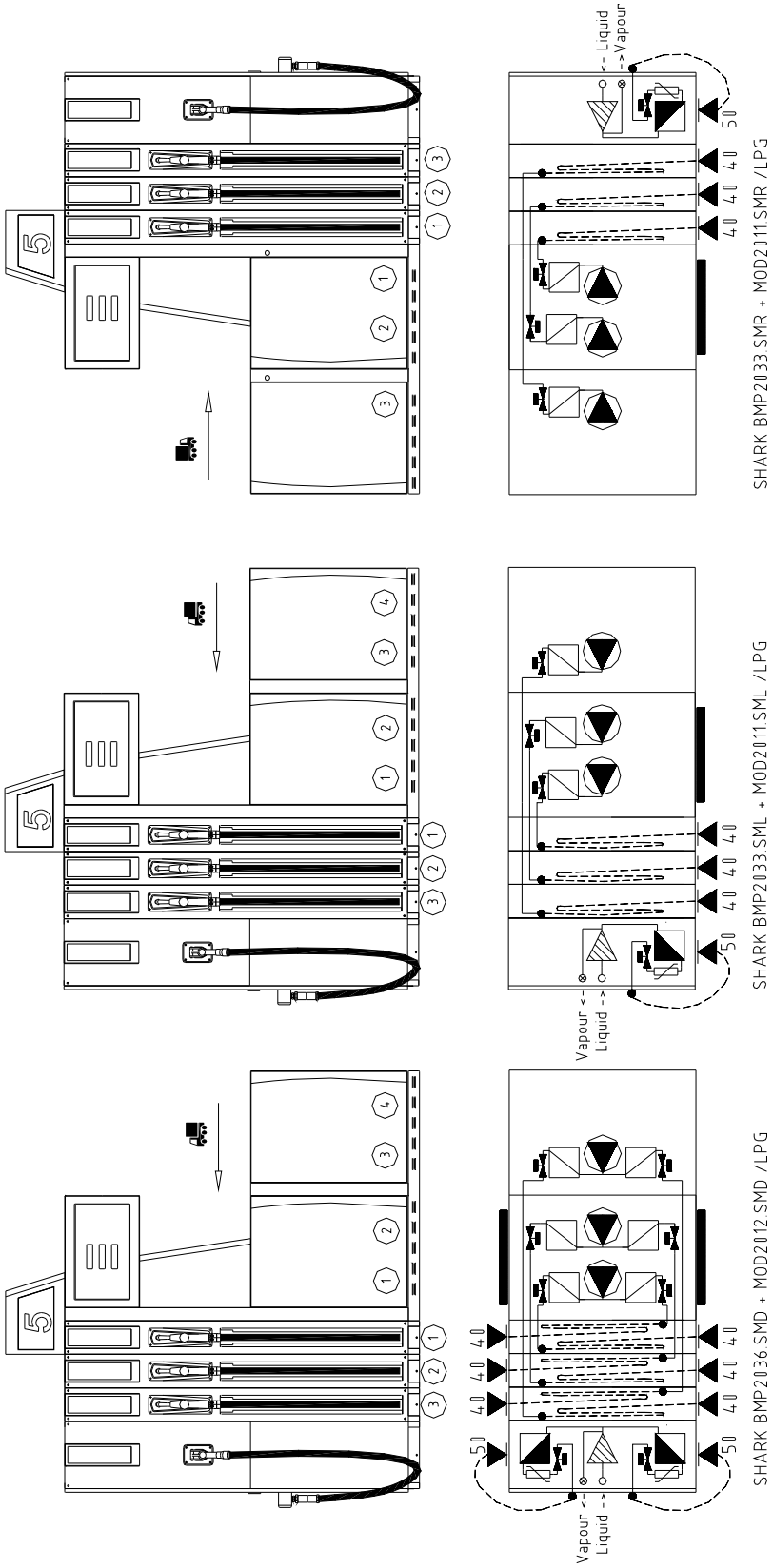



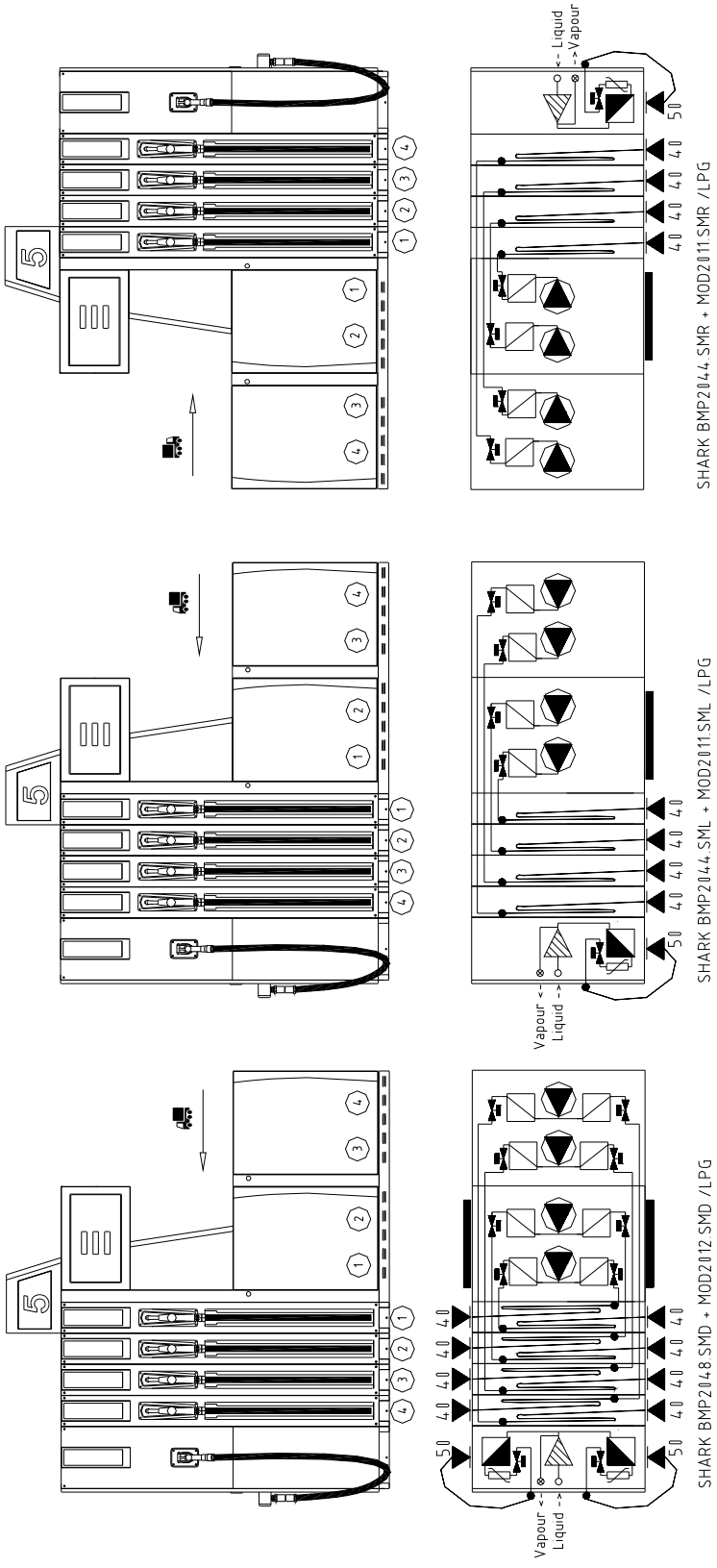
## H.3. Dispensers SHARK BMP2000.SM with Module MOD2000.SM/LPG - two-product design



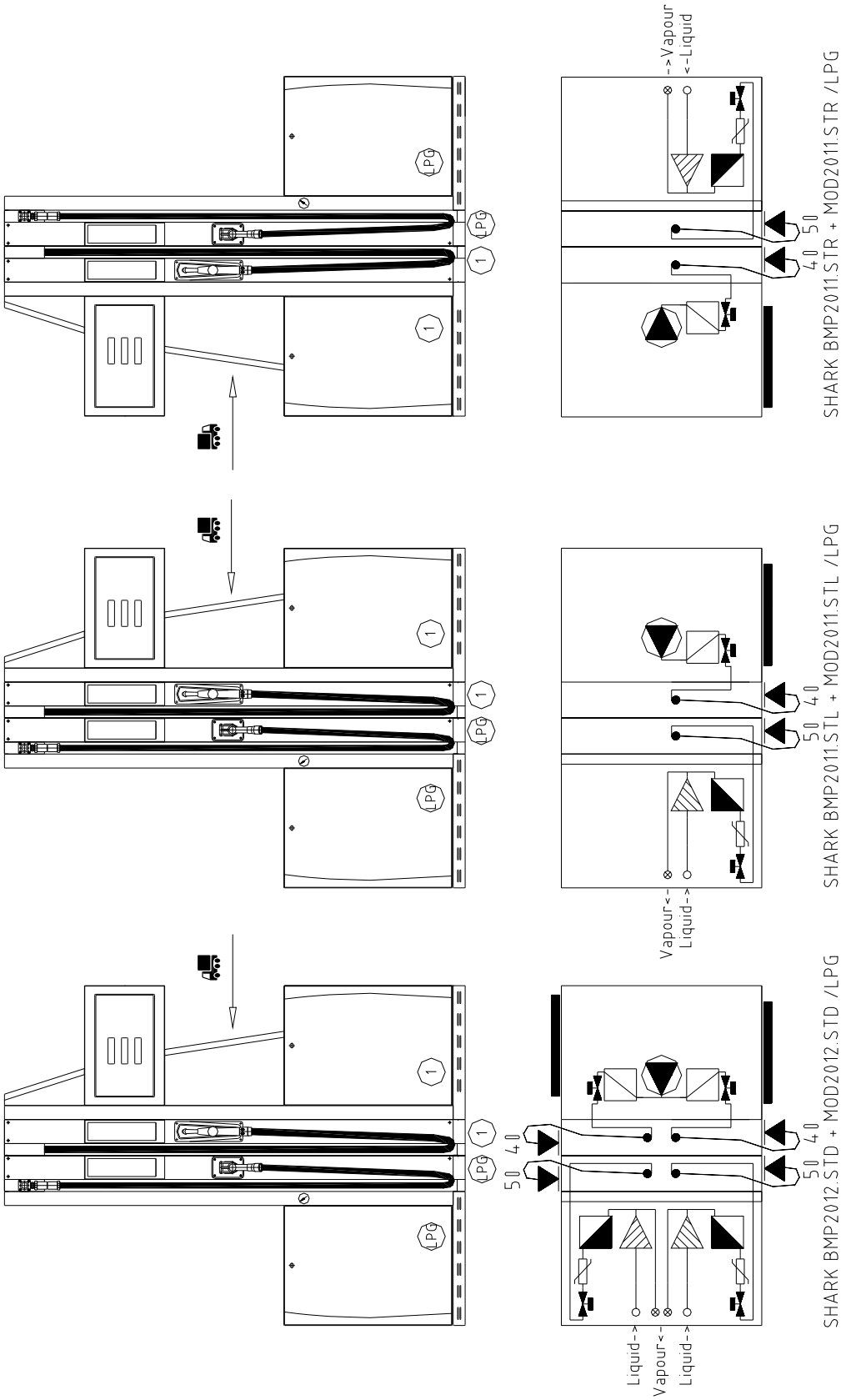
## H.4. Dispensers SHARK BMP2000.SM with Module MOD2000.SM/LPG - three-product design



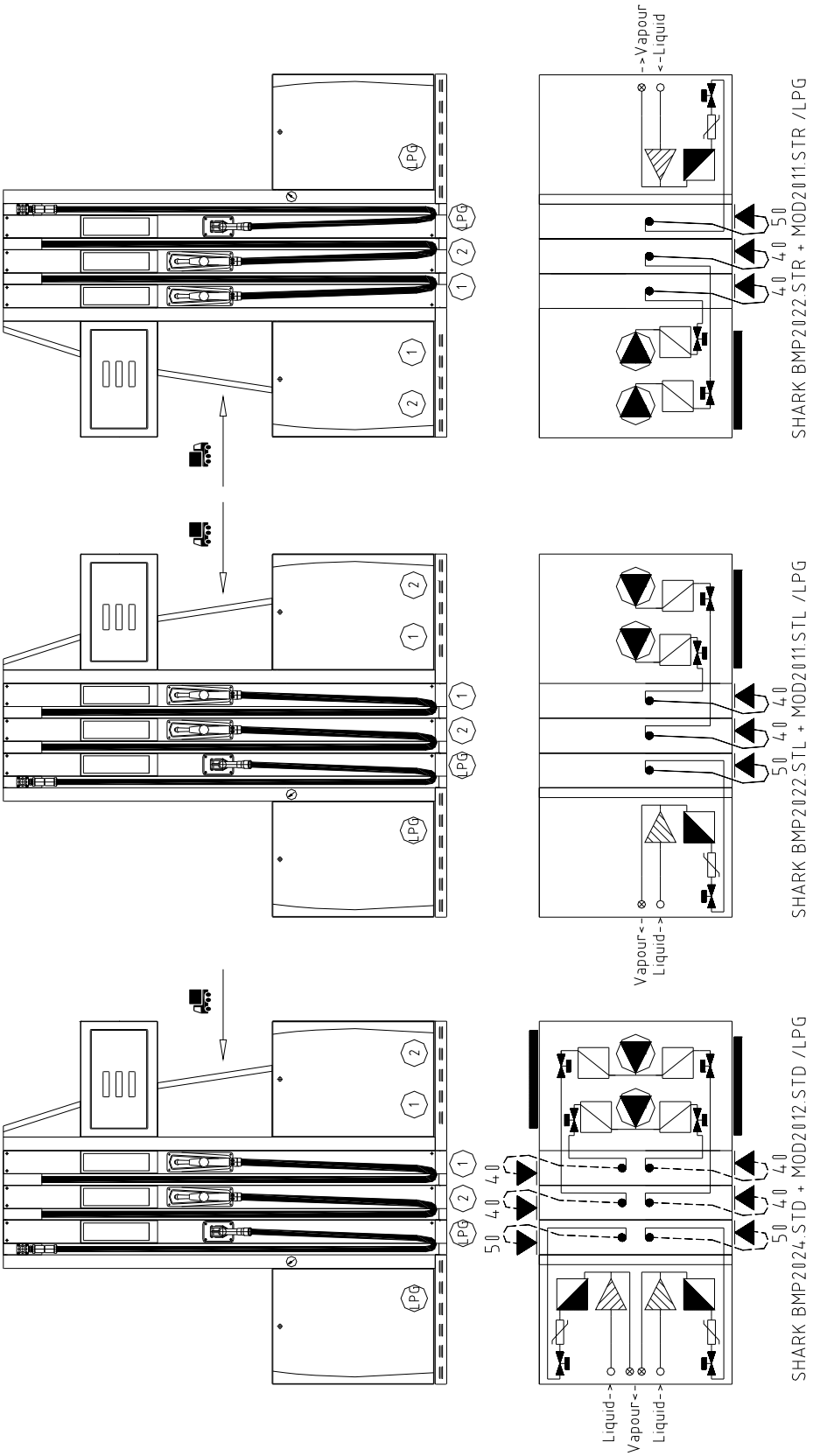
## H.5. Dispensers SHARK BMP2000.SM with Module MOD2000.SM/LPG - four-product design



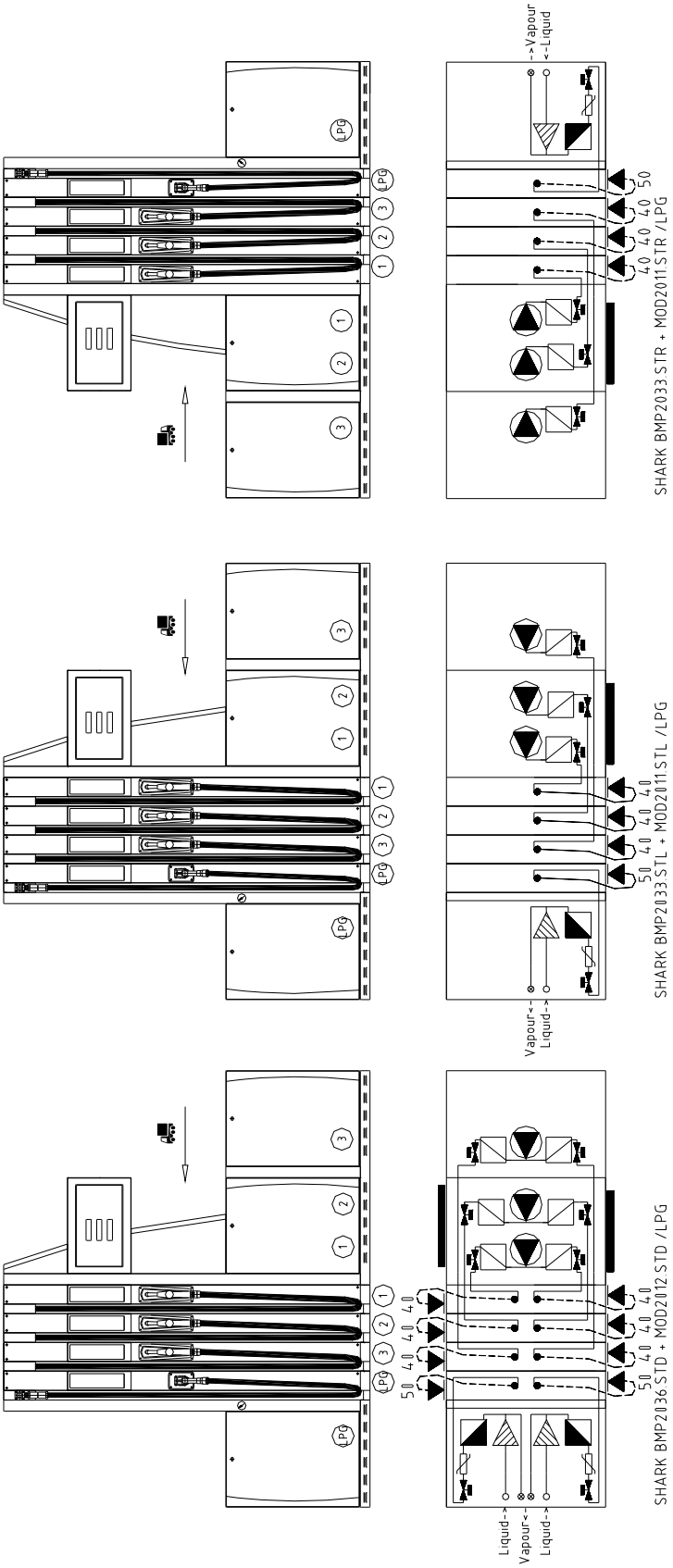
## H.6. Dispensers SHARK BMP2000.ST with Module MOD2000.ST/LPG - one-product design



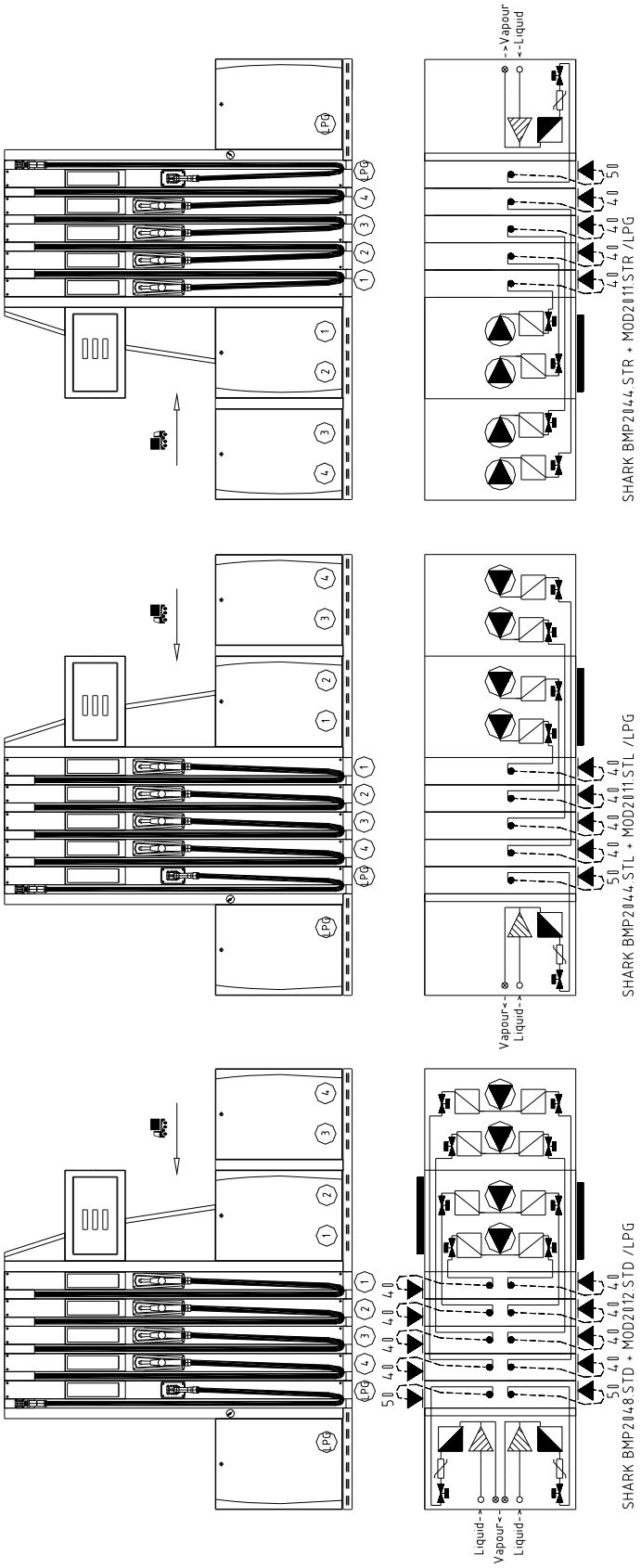
## H.7. Dispensers SHARK BMP2000.ST with Module MOD2000.ST/LPG - two-product design



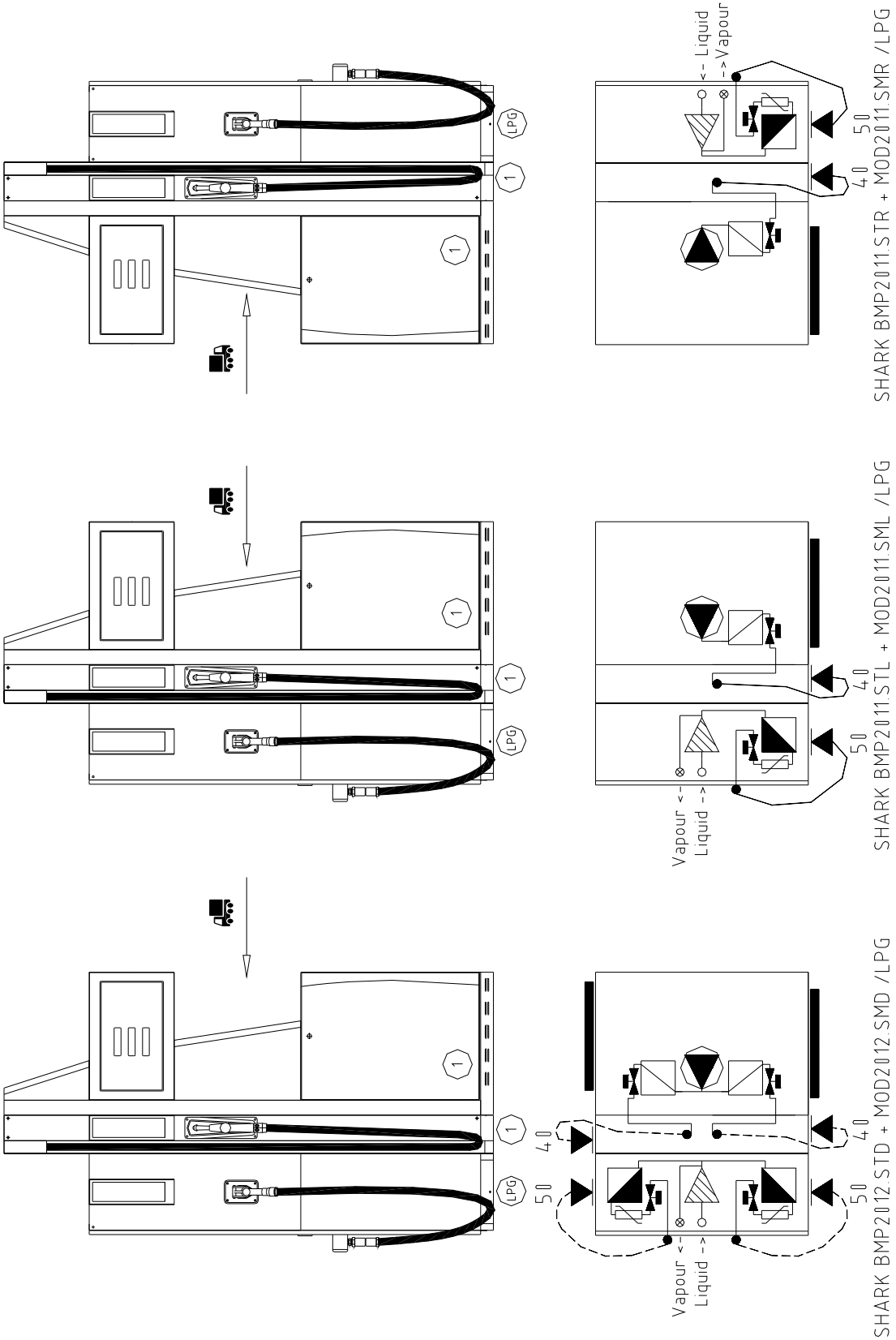
# H.8. Dispensers SHARK BMP2000.ST with Module MOD2000.ST/LPG - three-product design



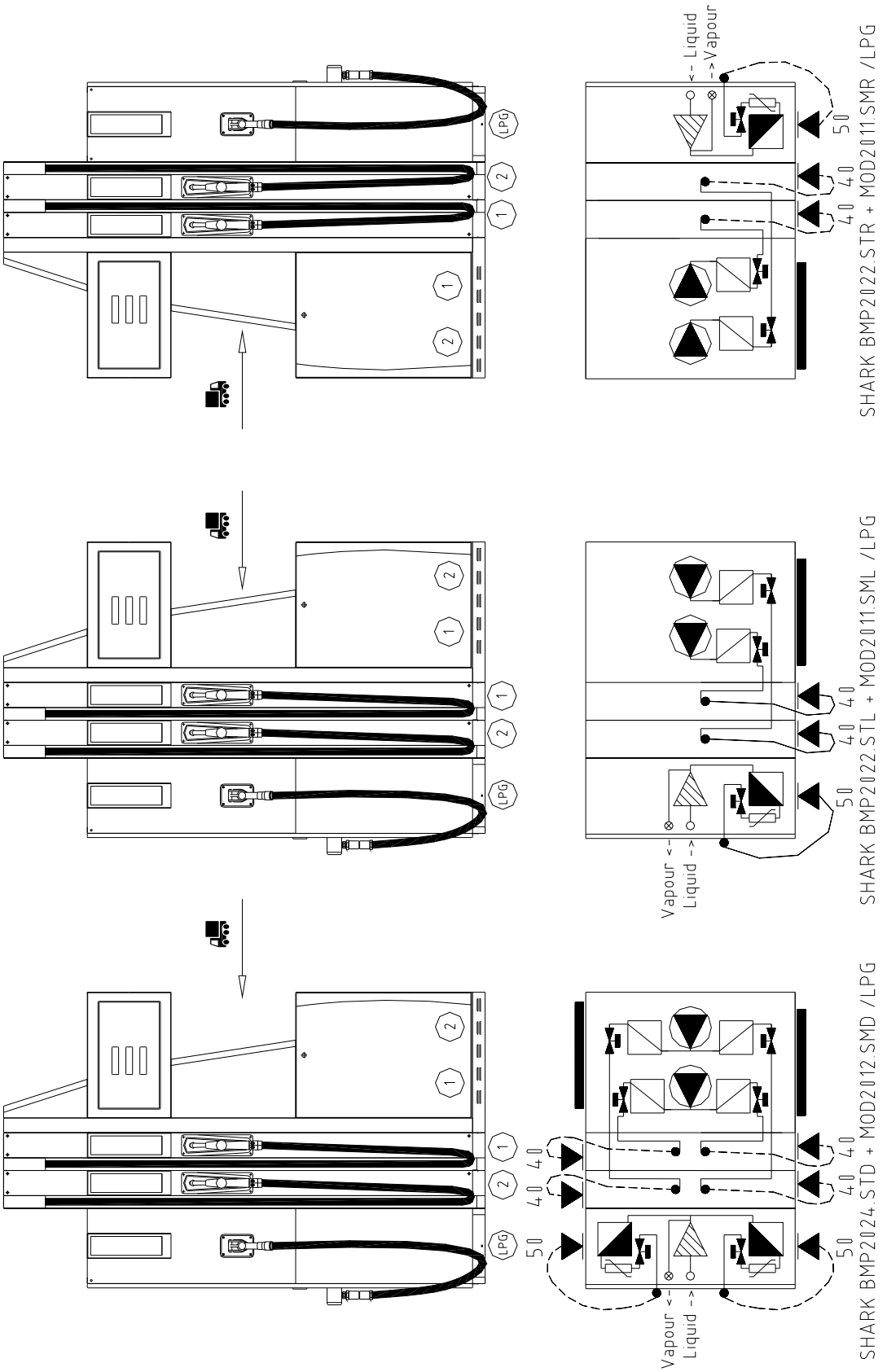
## H.9. Dispensers SHARK BMP2000.ST with Module MOD2000.ST/LPG - four-product design



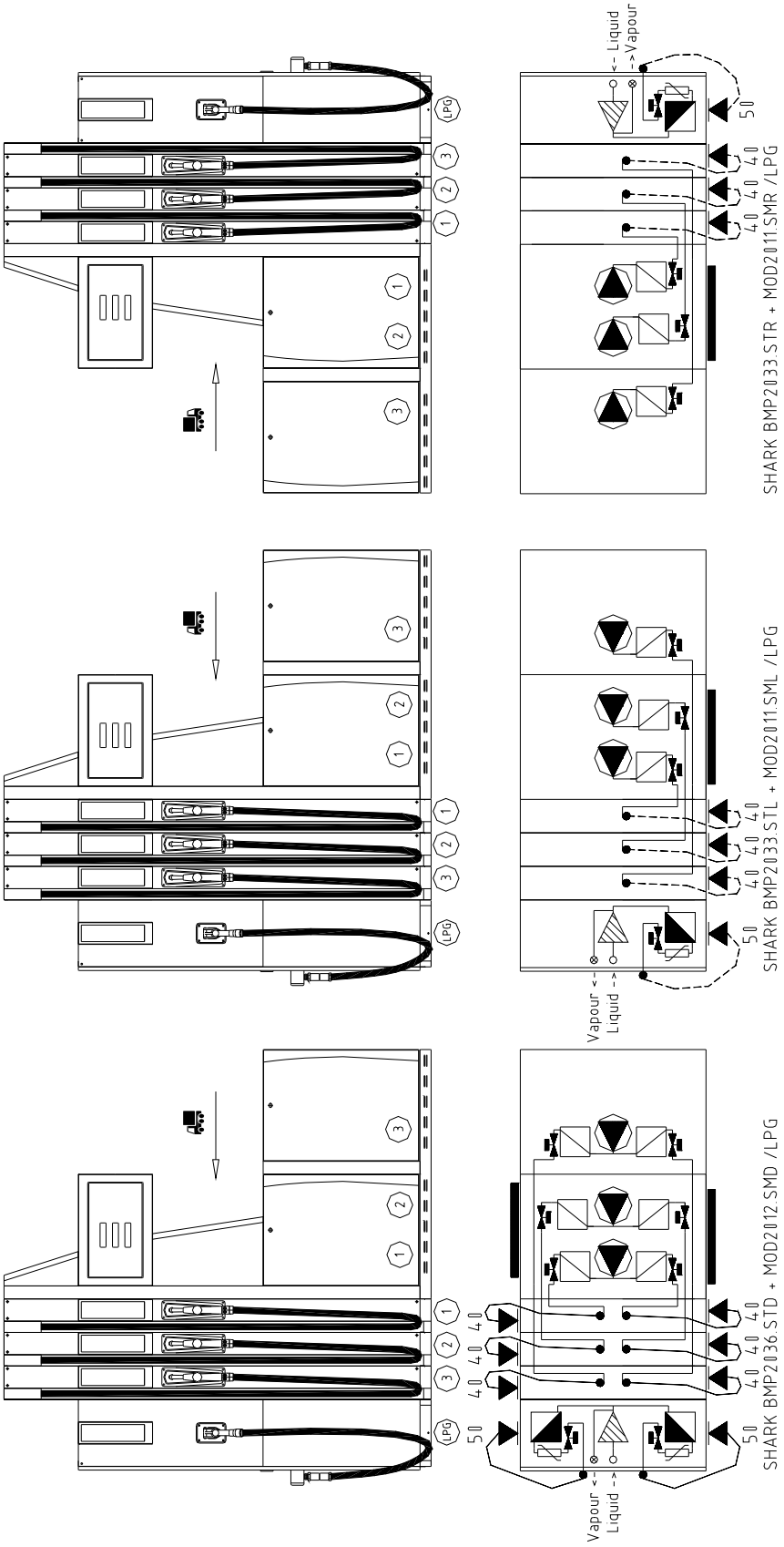
## H.10. Dispensers SHARK BMP2000.ST with Module MOD2000.SM/LPG - one-product design



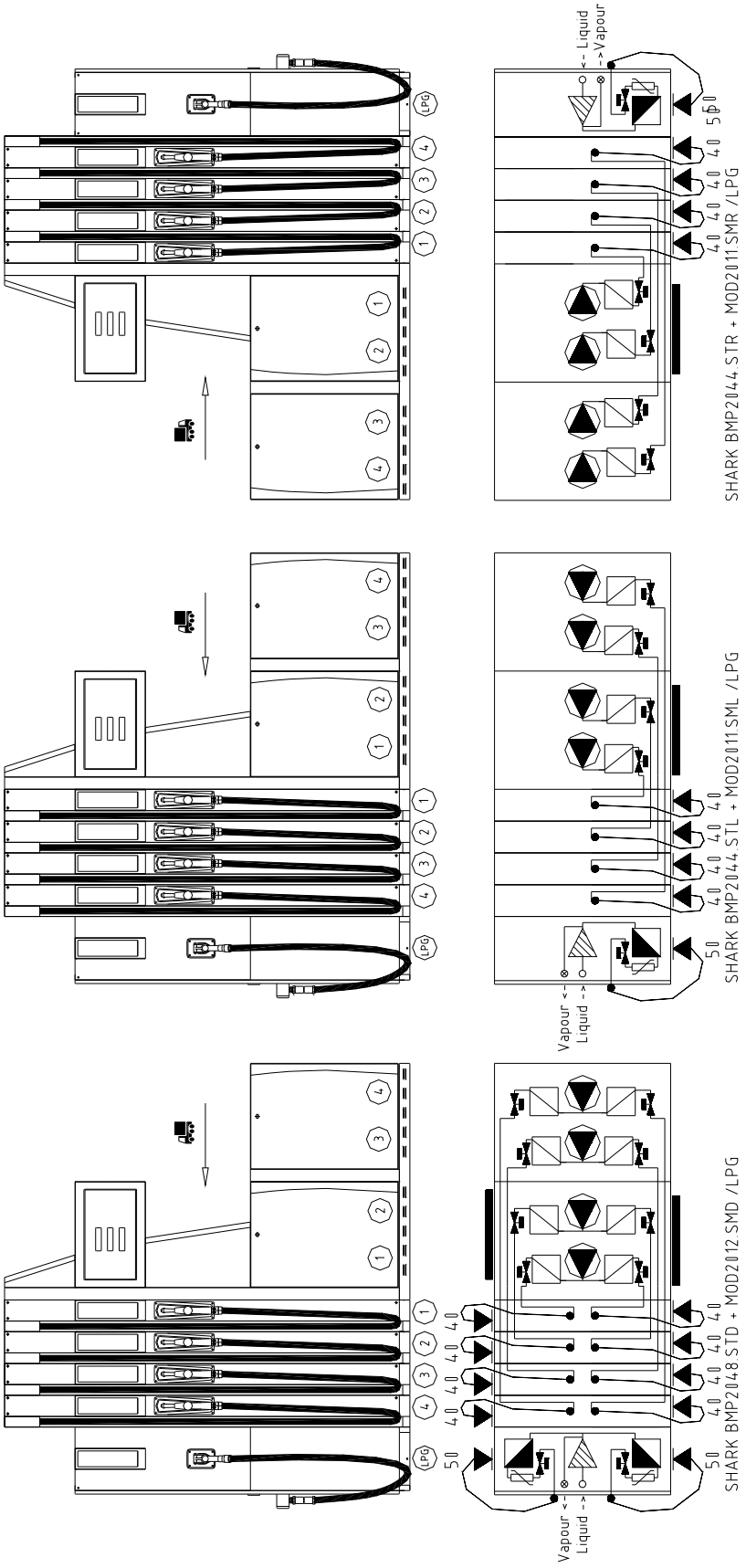
## H.11. Dispensers SHARK BMP2000.ST with Module MOD2000.SM/LPG - two-product design



## H.12. Dispensers SHARK BMP2000.ST with Module MOD2000.SM/LPG - three-product design



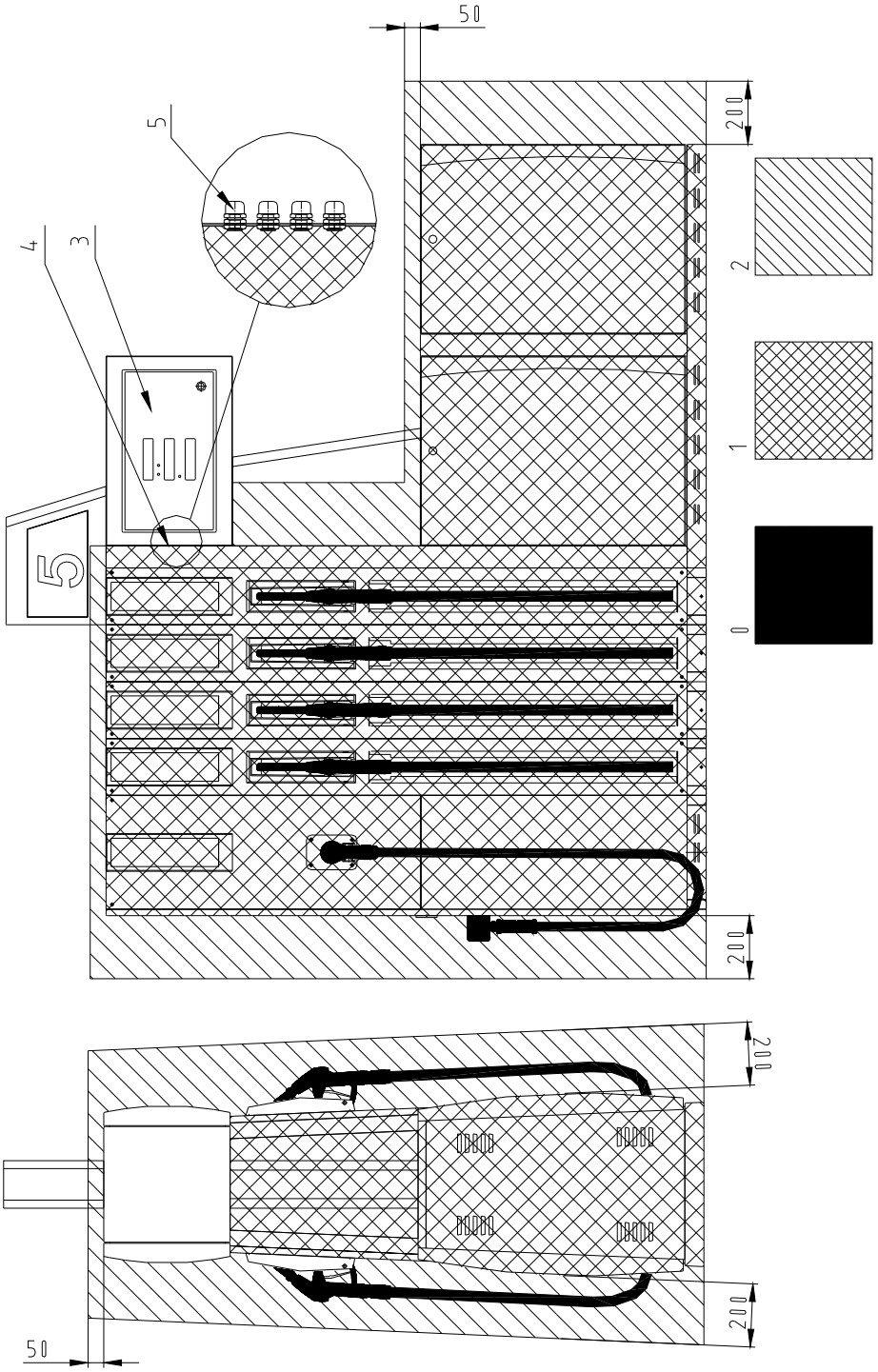
## H.13. Dispensers SHARK BMP2000.ST with Module MOD2000.SM/LPG - four-product design



# Installation and User Manual
# Appendix J – Zones

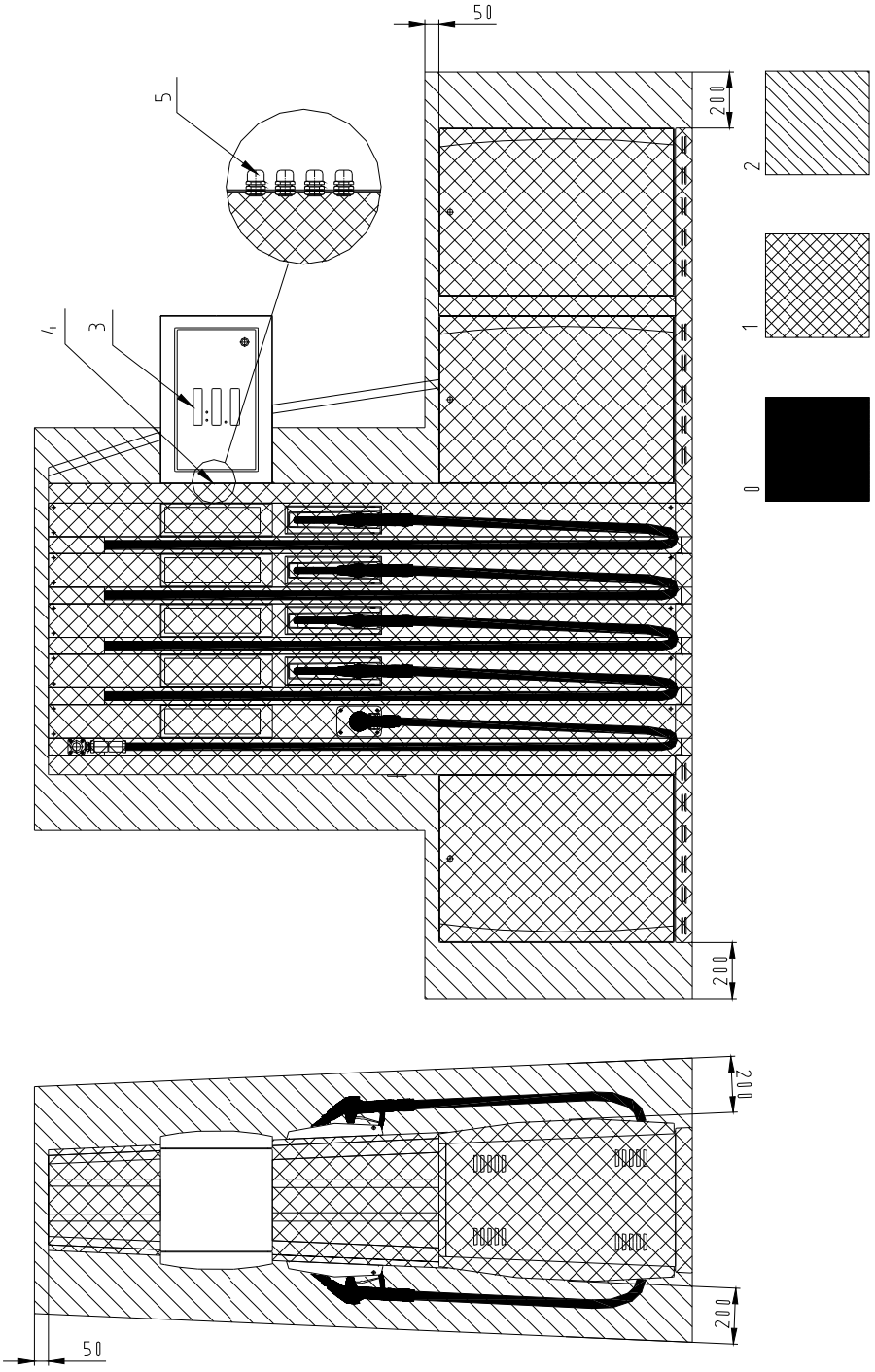
| | |
|---|---|
| Document: | Combined dispensers Liquid Fuel & LPG series SHARK BMP2000.S - Installation and User Manual Appendix J – Zones |
| Reference: | IN022-EN J_ExZones |
| Revision & Datum: | Revision 01, June 10, 2008 |
| Number of pages: | 5 (inclusive of cover) |
| Produced by: | Ing. Milan Berka |
| TATSUNO-BENČ EUROPE a.s., Pražská 68, 678 01 Blansko, Czech Republic, tel.+420 516 428411, http://www.benc.cz | |

# J.1. Zones for Combined Dispensers SHARK BMP2000.SM + MOD2000.SM/LPG according to EN 13617-1



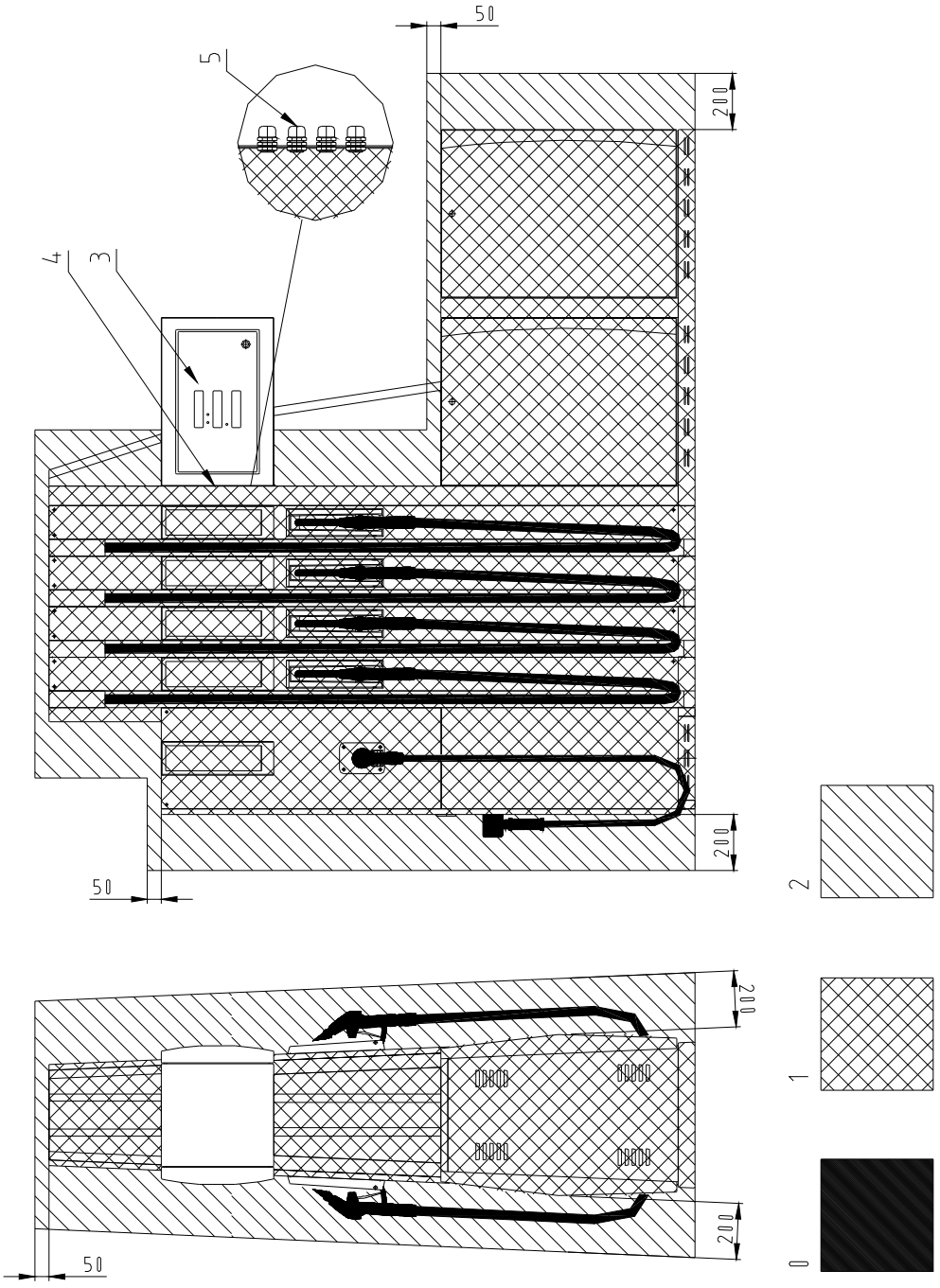

| Pos. | Description | Pos. | Description |
|---|---|---|---|
| 0 | **Zone 0** – room, where explosive gaseous atmosphere is present permanently or for long time period | 3 | Room without explosion hazard (cover IP54) |
| 1 | **Zone 1** – room, where can occur explosive gaseous during normal operation | 4 | Vertical partition of type 1 (detail) |
| 2 | **Zone 2** – room, where is not probable occurrence of explosive gaseous atmosphere during normal operation and when this atmosphere occurs it is probable that this situation should be only seldom and explosive gaseous atmosphere will be present here only for short time period | 5 | Non-explosive cable bushing in design EEx e II(IP67) |

# J.2. Zones for Combined Dispensers SHARK BMP2000.ST + MOD2000.ST/LPG according to EN 13617-1




| Pos. | Description | Pos. | Description |
|---|---|---|---|
| 0 | **Zone 0** – room, where explosive gaseous atmosphere is present permanently or for long time period | 3 | Room without explosion hazard (cover IP54) |
| 1 | **Zone 1** – room, where can occur explosive gaseous during normal operation | 4 | Vertical partition of type 1 (detail) |
| 2 | **Zone 2** – room, where is not probable occurrence of explosive gaseous atmosphere during normal operation and when this atmosphere occurs it is probable that this situation should be only seldom and explosive gaseous atmosphere will be present here only for short time period | 5 | Non-explosive cable bushing in design EEx e II(IP67) |

# J.3. Zones for Combined Dispensers SHARK BMP2000.ST + MOD2000.SM/LPG according to EN 13617-1




| Pos. | Description | Pos. | Description |
|---|---|---|---|
| 0 | **Zone 0** – room, where explosive gaseous atmosphere is present permanently or for long time period | 3 | Room without explosion hazard (cover IP54) |
| 1 | **Zone 1** – room, where can occur explosive gaseous during normal operation | 4 | Vertical partition of type 1 (detail) |
| 2 | **Zone 2** – room, where is not probable occurrence of explosive gaseous atmosphere during normal operation and when this atmosphere occurs it is probable that this situation should be only seldom and explosive gaseous atmosphere will be present here only for short time period | 5 | Non-explosive cable bushing in design EEx e II(IP67) |

# Installation and User Manual
# Appendix K – Certificates

| | |
|---|---|
| Document: | Combined dispensers Liquid Fuel & LPG series SHARK<br>BMP2000.S - Installation and User Manual<br>Appendix K – Certificates |
| Reference: | IN022-EN K_Certificates |
| Revision & Datum: | Revision 01, June 10, 2008 |
| Number of pages: | 9 (inclusive of cover) |
| Created by: | Ing. Milan Berka |
| TATSUNO-BENČ EUROPE a.s., Pražská 68, 678 01 Blansko, Czech Republic,<br>tel.+420 516 428411, http://www.benc.cz | |

# K.1. EC Type Examination Certificate - ATEX

Physical Technical Testing Institute
Ostrava-Radvanice

## EC-Type Examination Certificate

(1)

(2) **Equipment or Protective Systems Intended for use in Potentially Explosive Atmospheres Directive 94/9/EC**

(3) EC-Type Examination Certificate Number:

**FTZÚ 06 ATEX 0185X**

(4) Equipment: **Multi-product liquid fuel and LPG (propane-butane) dispenser, type series SHARK BMP 2xxx.SM + MOD 2xxx.SM /LPG**
**SHARK BMP 2xxx.ST + MOD 2xxx.ST /LPG**
**SHARK BMP 2xxx.ST + MOD 2xxx.SM /LPG**

(5) Manufacturer: **TATSUNO-BENČ EUROPE a.s.**

(6) Address: **Pražská 2325/68, 678 01 Blansko, Czech Republic**

(7) This equipment or protective system and any of acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

(8) The Physical Technical Testing Institute, notified body number 1026 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential Report N°

**06/0185 dated 15 December 2008**

(9) Compliance with Essential Health and safety requirements has been assured by compliance with:

**EN 13617-1:2005; EN 14678-1:2006**

(10) If the sign „X" is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-TYPE EXAMINATION CERTIFICATE relates only to the design, examination and testing of the specified equipment or protective system in accordance to the directive 94/9/EC.
Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this certificate.

(12) The marking of the equipment or protective system shall include following:

**Ex II 2G IIA T3**

This EC-Type Examination Certificate is valid till: **31.12.2013**

Responsible person:

Dipl. Ing. Šindler Jaroslav
Head of certification body

PHYSICAL-TECHNICAL TESTING INSTITUTE FTZÚ AO 210 NB 1026

Date of issue: 15.12.2008

Page: 1/5
Annex: 1 (3 pages)

This certificate is granted subject to the general conditions of the Physical Technical Testing Institute.
This certificate may only be reproduced in its entirety and without any change, schedule included.

FTZÚ, Pikartská 7, 716 07 Ostrava Radvanice, tel +420 595 223 111, fax +420 596 232 672, e-mail: ftzu@ftzu.cz

# K.2. Metrological EC Type Examination Certificate for PHM Dispenser

Český metrologický institut
Notifikovaná osoba č 1383, Okružní 31
638 00 Brno

## EC-TYPE EXAMINATION CERTIFICATE

**Number: TCM 141/07 - 4491**
**Addition 1**

Issued by: **Český metrologický institut**
**Okružní 31**
**638 00 Brno**
**Czech Republic**

**Notified Body No. 1383**

In accordance with: point 3 of annex 2 to Government Order No. 464/2005 Coll. (annex B of the Directive 2004/22/EC) from 19 October 2005 that lays down technical requirements on measuring instruments and implements in Czech Republic Directive 2004/22/EC of the European Parliament and of the Council.

Applicant: **TATSUNO-BENČ EUROPE a.s.**
**Pražská 68**
**678 01 Blansko**
**Czech Republic**

In respect of: **fuel dispenser for motor vehicles**
**type:** **SHARK BMP 5xx.S, SHARK BMP 2xxx.S**
**manufacturer:** **TATSUNO-BENČ EUROPE a.s.**

| Liquids | Gasolines, Diesel, Ethanol |
|---|---|
| Accuracy class | 0.5 |

Valid until: **16 January 2017**

Document number: **0115-CS-A004-07**

Description: Essential characteristics, approved conditions and special conditions, if any, are described in this certificate. This certificate contains 15 pages.

**Date of issue:** 26 May 2008

Český metrologický institut NOTIFIKOVANÁ OSOBA AO 250 1383 2

**RNDr. Pavel Klenovský**
Notified Body No.1383

## K.3. Metrological EC Type Examination Certificate for LPG module

**Český metrologický institut**
Notifikovaná osoba č 1383, Okružní 31
638 00 Brno

# EC-TYPE EXAMINATION CERTIFICATE

**Number: TCM 141/07 - 4493**
**Addition 1**

Issued by: **Český metrologický institut**
**Okružní 31**
**638 00 Brno**
**Czech Republic**

**Notified Body No. 1383**

In accordance with: point 3 of annex 2 to Government Order No. 464/2005 Coll. (annex B of the Directive 2004/22/EC) from 19 October 2005 that lays down technical requirements on measuring instruments and implements in Czech Republic Directive 2004/22/EC of the European Parliament and of the Council.

Applicant: **TATSUNO-BENČ EUROPE a.s.**
**Pražská 68**
**678 01 Blansko**
**Czech Republic**

In respect of: **fuel dispenser for motor vehicles**
**type: SHARK BMP 5xx.S/LPG, SHARK BMP 2xxx.S/LPG**
**manufacturer: TATSUNO-BENČ EUROPE a.s.**

| Liquids | LPG |
|---|---|
| Accuracy class | 1.0 |

Valid until: **16 January 2017**

Document number: **0115-CS-A006-07**

Description: Essential characteristics, approved conditions and special conditions, if any, are described in this certificate. This certificate contains 16 pages.

Český metrologický institut NOTIFIKOVANÁ OSOBA AO 250 1383 2

**Date of issue:** 26 May 2008

**RNDr. Pavel Klenovský**
Notified Body No.1383

## K.4. Q Certificate of Assurance of Quality

Fyzikálně technický zkušební ústav
Ostrava-Radvanice

# (1) OZNÁMENÍ O ZABEZPEČOVÁNÍ JAKOSTI

(2) **Zařízení nebo ochranné systémy určené pro použití v prostředí s nebezpečím výbuchu podle Směrnice 94/9/EC (NV 23/2003 Sb.)**

(3) Číslo oznámení:

**FTZÚ 02 ATEX Q 030**

(4) Skupina výrobků: **Výdejní stojany pohonných hmot s příslušenstvím s typem ochrany: Pevný závěr „d", zajištěné provedení „e", zalití zalévací hmotou „m"**

(5) Žadatel: **TATSUNO-BENČ EUROPE a.s.,** Pražská 2325/68, 678 01 Blansko

(6) Výrobce: **TATSUNO-BENČ EUROPE a.s.,** Pražská 2325/68, 678 01 Blansko

(7) Fyzikálně technický zkušební ústav, notifikovaný orgán č. 1026 podle článku 9 směrnice Rady 94/9/EC z 23. března 1994, oznamuje žadateli, že systém jakosti výrobce zařízení splňuje požadavky přílohy IV a VII směrnice.

(8) Toto oznámení se vydává na základě protokolu z auditu č. FTZÚ 02/ATEX/030 vydaného dne 22. července 2008 a prodlužuje platnost předchozího oznámení, vydaného dne 27.07.2005.

Toto oznámení může být zrušeno, pokud výrobce již dále nebude plnit požadavky uvedené v příloze IV a VII směrnice.

Výsledky periodických dozorových auditů systému jakosti jsou součástí tohoto oznámení.

(9) Toto oznámení platí do 31. července 2011 a může být zrušeno, pokud výrobce nevyhoví při periodickém dozorovém auditu.

(10) Podle článku 10(1) směrnice 94/9/EC musí být označení CE doplněno identifikačním číslem 1026, které označuje FTZÚ jako notifikovaný orgán zapojený do kontroly výrobního procesu.

Odpovědná osoba:

**Ing. Šindler Jaroslav**
vedoucí certifikačního orgánu

PHYSICAL-TECHNICAL TESTING INSTITUTE
FYZIKÁLNĚ TECHNICKÝ ZKUŠEBNÍ ÚSTAV
FTZÚ
AO 210
NB 1026

Datum vydání: 01.08. 2008

Počet stran: 1/2

Toto oznámení může být rozmnožováno pouze v celku a bez jakýchkoliv změn.

Fyzikálně technický zkušební ústav, s.p., Pikartská 7, 716 07 Ostrava Radvanice,
tel: +420 595 223 111, fax: +420 596 232 672, e-mail: ftzu@ftzu.cz

## K.5. Certificate of Quality System

**Český metrologický institut**
Notifikovaná osoba č. 1383, Okružní 31
638 00 Brno

# CERTIFIKÁT O SYSTÉMU MANAGEMENTU JAKOSTI

**číslo: 0119-SJ-C006-07**

## PRO VÝROBU, VÝSTUPNÍ KONTROLU A ZKOUŠENÍ

**podle přílohy č. 2, postupu D, NV č. 464/2005 Sb.**

Vydává: **Český metrologický institut**
**Okružní 31**
**638 00 Brno**
**Česká republika**
**Notifikovaná osoba č. 1383**

Na základě: výsledku posouzení systému managementu jakosti výroby, výstupní kontroly a zkoušení měřících systémů pro kontinuální a dynamické měření množství kapalin jiných než voda, provedeného v souladu se zákonem č. 22/1997 Sb., o technických požadavcích na výrobky v platném znění, nařízením vlády č. 464/2005 Sb. (dále jen NV), kterým se stanoví technické požadavky na měřidla a které implementuje v České republice Směrnici Evropského parlamentu a Rady 2004/22/ES.

Žadatel (výrobce): **TATSUNO-BENČ EUROPE a.s.**
**Pražská 2325/68**
**678 01 Blansko**
**Česká republika**
**IČ: 26221454**

Způsobilost pro: **prohlašování shody s typem založené na zabezpečování jakosti výroby měřidel dle přílohy č. 2, postupu „D" (kap. 6) NV.**

Pro:

| Měřidlo | Typ | č. certifikátu ES přezkoušení typu |
|---|---|---|
| Měřící systém pro kontinuální a dynamické měření množství kapalin jiných než voda | SHARK BMP 5xx.S<br>SHARK BMP 2xxx.S | TCM 141/07 – 4491 |
| Měřící systém pro kontinuální a dynamické měření množství kapalin jiných než voda | SHARK BMP 2xxx.S/AdB | TCM 141/07 – 4492 |
| Měřící systém pro kontinuální a dynamické měření množství kapalin jiných než voda | SHARK BMP 5xx.S/LPG<br>SHARK BMP 2xxx.S/LPG | TCM 141/07 – 4493 |

Grafická podoba zabezpečovací značky v provedení jako samolepicí štítek:

Nedílnou součástí tohoto certifikátu jsou Zásady pro užívání certifikátu.

Datum vystavení: 24.10.2007

**RNDr. Pavel Klenovský**
notifikovaná osoba č.1383

1

## K.4. ISO 9001:2000 Certificate

TÜV CERT

# CERTIFIKÁT

TÜV CERT-certifikační místo
TÜV SÜD Management Service GmbH

potvrzuje dle
postupu TÜV CERT, že společnost

TATSUNO Benč

**TATSUNO-BENČ EUROPE a.s.**
**Pražská čp. 2325/68**
**CZ - 678 01 Blansko**

zavedla a používá
systém řízení jakosti v oboru

**Vývoj, výroba, prodej a servis**
**výdejních stojanů na kapalná paliva.**
**Prodej náhradních dílů výdejních stojanů.**

Podle auditu, zpráva č. **70004869**

bylo prokázáno splnění
požadavků normy

**ISO 9001: 2000**

Tento certifikát je platný do **2009-07-02**

Registrační číslo certifikátu **12 100 14238**

Deutscher Akkreditierungs Rat DAR

TGA-ZM-18-96

Mnichov, 2006-07-03

TÜV SÜD Management Service

TÜV CERT-certifikační místo
TÜV SÜD Management Service GmbH
Ridlerstraße 65
D-80339 München